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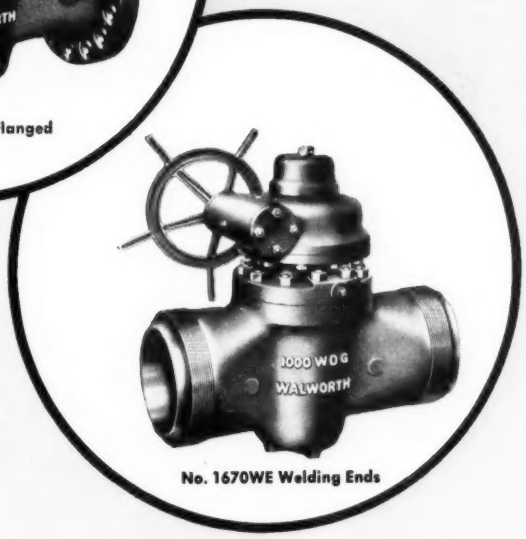

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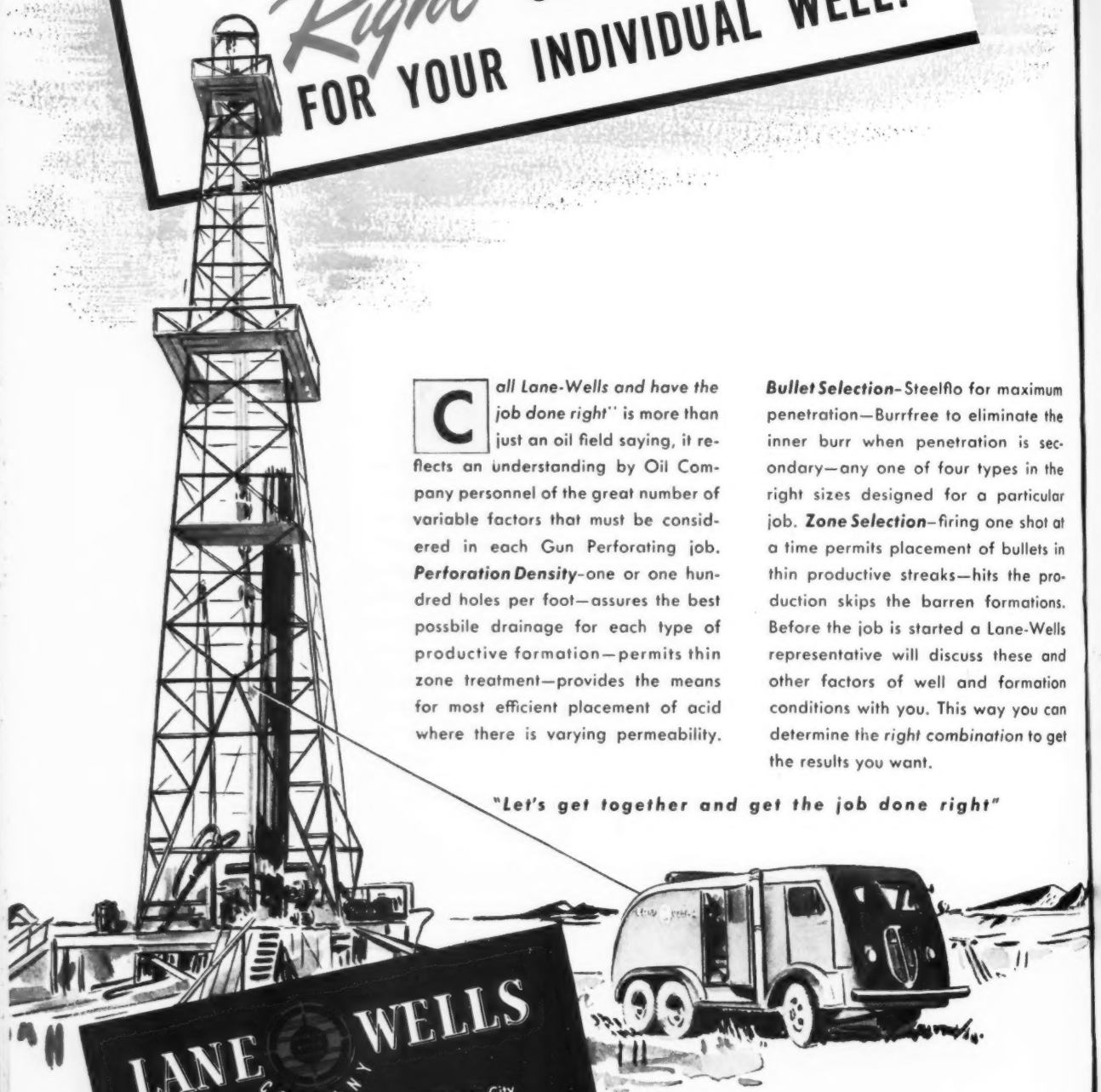

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Subscription rate to the petroleum industry, United States and foreign, 1 year, $3.00. Single copies, 20 cents. Back copies, when over a year old, 50 cents. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1946 by The Petroleum Publishing Co.

Vol. 45, No. 29 November 23, 1946

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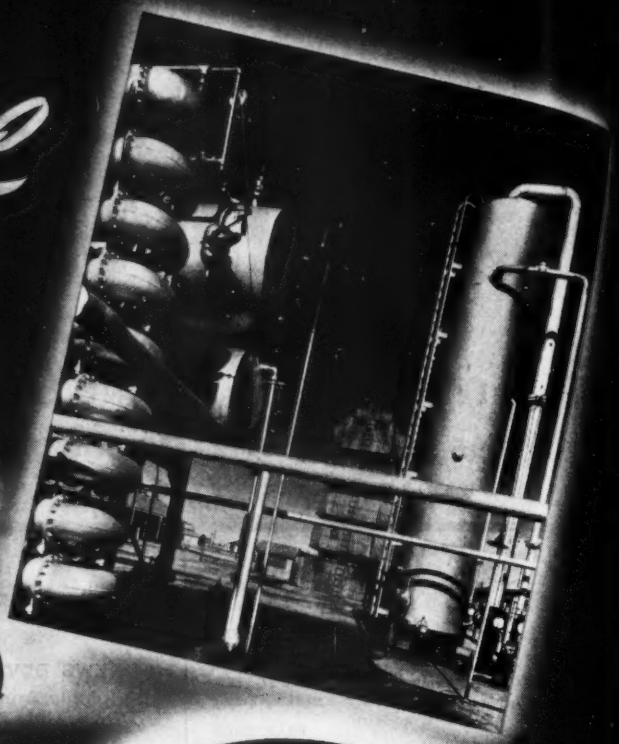

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PETROLEUM · A PROGRESSIVE INDUSTRY!

YOU will hear and see more of the above statement of fact and challenge which last week greeted the hundreds who attended the general A.P.I. sessions at Chicago. As a slogan, if it should be termed that, it epitomizes the program around which oil men everywhere can rally to meet new conditions at the start of a new period in peacetime opportunities, which in potentialities dwarf anything of the past.

To some, "progressive" may appear trite and shopworn. But it symbolizes, as no other word does, past attainments of the oil business and the plans for continued growth. Consistently, the Latin derivation of "progress" is to "walk forward," and it has been defined as a "steady and constant forward movement, admitting of pause, but not of retreat."

If there be those outside the industry who would question its claim to progressiveness, the A.P.I. proceedings are of themselves an adequate answer. Past accomplishments were reviewed, but only as a background to future achievements.

Phenomenal strides were made in refinery processing over the past 5 years, but the technical papers of that division were largely devoted to new research and development upon which next year's operations and those of the following years will be based.

Reports were presented showing the large increase in demands during the war period and since for intermediate products, with further expansion assured. There is no disposition on the part of refiners and distributors to sit back and reap this harvest of past efforts. Rather, the prepared papers of the A.P.I. meeting were concerned with how to improve the quality of furnace oils, diesel oils, and other products in order better to serve present customers and attract new ones.

One operator, having in mind the reports of the past 2 years on the subject, skeptically approached a symposium on secondary recovery with the observation, "There can't be anything new on that subject." He found that there was. The industry's techniques, responding to old and new economic forces, are advancing rapidly in several directions.

It may be asked: Why emphasize something now that has been going on for many years? The answer is that there is an additional job to be done. The public doesn't know and must be told about the progressiveness of the petroleum industry. That in substance is the objective of the public-relations program which got under way at Chicago.

Humble Announes General Price Increase of 10 Cents on Crude Oil

FOLLOWING local price increases in crude announced last week by Sun Oil Co. in certain Texas fields (see schedule below)—and subsequently met in the same areas by Sinclair Prairie Oil Co., crude marketing division—Humble Oil & Refining Co. on Tuesday announced a general price increase, retroactive to 7:00 a.m. Friday, November 15.

Humble's new price bulletin No. 197, effective 7:00 a.m. November 15, gave increases of 10 cents per barrel on all gravities of crude oil purchased, except low-cold-test Texas Gulf Coast crude and low-gravity Mirando crude, which was increased basically 20 cents per barrel on the gravities posted.

Low-cold-test Texas Gulf Coast crude is posted at $1.69 per barrel for crude of below 24° gravity, increasing 2 cents per degree to a top price of $1.83 per barrel for 30° and above. This is 1° higher than the top scale of 29° on the Sun scale shown in the accompanying table.

Low gravity Mirando crude is posted at $1.66 per barrel for crude of below 24° gravity, increasing 2 cents per degree of gravity to a top price of $1.78 per barrel for 29° and above, which is same as Sun's posting.

Steady growth of premium payments in recent weeks, particularly in the Gulf Coast fields for good lube oil crudes, and in East Texas, is believed responsible for the increases announced. It is generally believed that all major buyers in competition with Humble will meet the increase promptly. Most observers are of the opinion that the price increase will spread rapidly, due to competition for crude among buyers, and that at least all areas east of California will be affected very shortly.

COMPLETE NEW SUN OIL CO. PRICE POSTING

Gravity—	Coastal Grade A	Tex. and La. Gulf Coast	Anahuac	Delhi	Sweden	Mirando	Guerra
Below 24	$1.69	$1.59	$1.51	$1.36	$1.46	$1.66	$1.56
24-24.9	1.71	1.61	1.53	1.38	1.48	1.68	1.58
25-25.9	1.73	1.63	1.55	1.40	1.50	1.70	1.60
26-26.9	1.75	1.65	1.57	1.42	1.52	1.72	1.62
27-27.9	1.77	1.67	1.59	1.44	1.54	1.74	1.64
28-28.9	1.79	1.69	1.61	1.46	1.56	1.76	1.66
29 and above	1.81	...	...	...	...	1.78	...
29-29.9	...	1.71	1.63	1.48	1.58	...	1.68
30-30.9	...	1.73	1.65	1.50	1.60	...	1.70
31-31.9	...	1.75	1.67	1.52	1.62	...	1.72
32-32.9	...	1.77	1.69	1.54	1.64	...	1.74
33-33.9	...	1.79	1.71	1.56	1.66	...	1.76
34-34.9	...	1.81	1.73	1.58	1.68	...	1.78
35-35.9	...	1.83	1.75	1.60	1.70	...	1.80
36-36.9	...	1.85	1.77	1.62	1.72	...	1.82
37-37.9	...	1.87	1.79	1.64	1.74	...	1.84
38-38.9	...	1.89	1.81	1.66	1.76	...	1.86
39-39.9	...	1.91	1.83	1.68	1.78	...	1.88
40 and above	...	1.93	1.85	1.70	1.80	...	1.90

Clay Creek	$1.45	East Texas	$1.70
Conroe	1.88	South Cotton Lake	1.80

Coastal Grade A (segregated) includes Batson (Old) below 26°, Esperson below 26°, Goose Creek below 26°, Hull below 26°, Humble below 26°, Kirby below 26°, Orange below 26°, West Orange below 26°, Saratoga below 26°, Sour Lake below 26°, fields in Texas; and Bayou Blue below 30°, and Vinton below 26°, fields in Louisiana.

Texas and Louisiana Gulf Coast includes Cedar Bayou, Cotton Lake, Cottonwood, Esperson 26° to 34° inclusive. Gilbert Ranch, Humble Light, Labelle, Nome, North Winnie Sour Lake 26° and above, South Liberty, and Stowell fields in Texas; and Bayou Blue 29° and above, Bellen Isle below 36°, Chacahoula, Hackberry (East and West), and Vinton 26° and above, fields in Louisiana.

Anahuac includes Anahuac, Batson (New), Caplen, Esperson 35° and above, Fig Ridge, Hull 26° and above, Kirby 26° and above, Oyster Bayou, Saratoga 26° and above, Seabreeze, South China, South Esperson, Turtle Bay, Turtle Bay, East, West Orange 26° and above, and Willow Slough.

Delhi includes Big Creek, Delhi, West Delhi, and South Big Creek.

Sweden includes Blucher, Dan Sullivan, East, Flores, Frost, Garcia, Gyp Hill, North Rincon, North Sun, Seeligson, Sun, Tijerina Canales, and Weil fields in Southwest Texas; and Hardin field in upper Texas Gulf Coast; and Egan and Belle Isle distillate fields in Louisiana.

Mirando includes Government Wells (North and South), Holland, and Sarnosa.

Guerra includes Guerra and Yturria fields.

December Allowable in Texas Lowest for Year

DALLAS.—The Texas Railroad Commission last week set December allowables at 2,133,618 bbl. daily, the lowest this year, and 130,416 bbl. daily under the November allowable of 2,264,034 bbl., after hearing testimony indicating aboveground stocks would increase due to seasonal slump.

Most purchasers remained silent, indicating satisfaction with present rates. However, producers were concerned with the increased stocks and asked that allowables be reduced. The Bureau of Mines forecast of demand for Texas crude during December of 2,050,000 bbl. daily was 40,000 bbl. under its November estimate.

The expected total daily production of Texas crude is 2,000,267 bbl. a day, or 49,733 bbl. under the bureau's estimated demand. In addition, distillate and natural-gasoline production is estimated at 180,997 bbl. daily during December, or a total production of 2,181,264 bbl. daily.

Reductions in output were accomplished by reducing the number of producing days, which for most fields was from the present 25, to 23 days in December. East Texas remains at 21 producing days in December but will decline 10,357 bbl. daily due to one less calendar day. Olin Culberson, commission chairman, said that West Texas' continued 21-day schedule represented pipe-line capacity.

Nominations for December crude oil totaled 2,438,087 bbl. daily, or an increase of 2,129 bbl. over November. Southwest Texas demand was up 6,089 bbl. daily and North Texas demand up 4,066 bbl. daily. Gulf Coast demand was off 3,540 bbl. daily and Panhandle nominations were 5,246 bbl. below November.

Phillips Advances Mid-Continent Crude

Phillips Petroleum Co. Tuesday announced a 10-cent-per-barrel increase in crude prices, retroactive to November 15, in Oklahoma, Kansas, and Texas Panhandle.

Littlejohn Says Bids Too Low for Little, Big-Inch

WASHINGTON.—War Assets Administration has rejected all bids for purchase of the two big-inch pipe lines, Administrator Robert M. Littlejohn told the House surplus property investigating committee as hearings opened Tuesday.

Littlejohn said they were rejected because they failed to give the Government a fair price. The two lines, which cost approximately $143,000,000, are appraised by WAA at $113,700,000, and the administrator said he thought the bids should get within shooting range of the appraised value.

All of the 16 bidders may submit new bids within 2 weeks.

Littlejohn assured the committee the sale contract would require use of the lines in such a way that they could be taken back by the Government for oil use in time of national emergency and for this reason it made little difference whether the lines are used for oil or gas.

JAKE L. HAMON | DR. ROBERT E. WILSON | B. J. MAJEWSKI | L. S. WESCOAT

Three new vice presidents and a new treasurer were elected at last week's meeting of the A.P.I. Hamon is vice president for production, Wilson for refining, and Majewski for marketing. Wescoat is new treasurer. B. Brewster Jennings was reelected vice president for transportation

A.P.I. Seeks Clarification of State Department's Attitude on Treaty

by Charles J. Deegan

THE American Petroleum Institute closed its twenty-sixth and largest annual meeting with the election of officers and directors, approval of the proposed public-relations program, and adoption of a resolution calling on the State Department to clarify its attitude on the proposed Anglo-American oil treaty when it is presented to the U. S. Senate for ratification.

The directors of the Institute took note of the recent public utterances of representatives of the State Department regarding various forms of international control of oil. In a resolution directed to the State Department, the directors called attention to their action of November 13, 1945, in approving the proposed Anglo-American agreement on petroleum as revised after consultation with industry representatives, and submitted to the U. S. Senate.

The new resolution then went into detail as to the exact understanding of the meaning of various parts of the proposed agreement, the authority that it was intended to convey, and in particular the fact that it was to provide only for consultation, not for authority to control or direct petroleum activities. The understanding of the meaning of the proposed agreement previously held by oil men was summarized under three headings.

Then the new resolution called attention to the public statements of certain representatives of the State Department which indicated that these representatives either had a different concept of the meaning of the proposed agreement, or intended it to be only a first step in a series of international agreements, which would supplement the pending Anglo-American oil agreement.

The A.P.I. Gold Medal for Distinguished Service was presented to Henry Ford. Here, Henry Ford II accepts the award from William R. Boyd, Jr., Institute president, on behalf of his grandfather

The concluding paragraphs of the resolution as finally adopted were:

Whereas, these public statements by such representatives of the Department of State give serious concern to the directors of the American Petroleum Institute for the reason that they had understood and assumed that the Department of State had interpreted and understood the terms, provisions and purposes of the Anglo-American oil treaty in the same way as the directors of the American Petroleum Institute:

That we respectfully urge and recommend to the Department of State of the United States that in presenting the Anglo-American oil treaty to the Senate of the United States for ratification it do so with the definite and distinct representation that the terms, provisions, and purposes of said treaty are as hereinabove set forth as being understood by the directors of the American Petroleum Institute, so that when ratified by the Senate of the United States, such treaty will be so understood and interpreted by all.

Public Relations Highlight

The above resolution was passed after the directors voted down overwhelmingly a proposal that the Institute withdraw its previous year's approval of the proposed agreement.

The public-relations problem and the various aspects of the proposed program had been highlights of the entire meeting. The program presented by the special subcommittee and approved by the standing public-relations committee was adopted. For details on the program, see page 44 this issue. For details of the problem and the report of the public-opinion survey, see The Oil and Gas Journal, November 16, 1946, pages 170-179.

Lacey Walker, A.P.I. secretary, who was in active charge of arrangements for the convention

The new officers: President, W. R. Boyd, Jr., reelected; vice president for production, Jake L. Hamon, of Cox & Hamon, Dallas, who succeeds George A. Hill, Jr., of Houston Oil Co. of Texas; vice president for refining, Robert E. Wilson, Standard Oil Co. (Indiana), who succeeds J. Howard Pew, Sun Oil Co.; vice president for marketing, B. L. Majewski, Deep Rock Oil Corp., who succeeds E. V. Weber, Eureka Oil Co.; vice president for transportation, B. Brewster Jennings, Socony-Vacuum Oil Co., reelected (this is the second year of the transportation division's existence); treasurer, L. S. Wescoat, The Pure Oil Co., who succeeds O. D. Donnell, The Ohio Oil Co.; secretary and assistant treasurer, Lacy Walker, reelected.

Executive Committee

The following are the members of the executive committee for the coming year: Walter S. Hallanan, Plymouth Oil Co.; Donnell; Hill; Pew; A. C. Mattei, Honolulu Oil Corp.; W. H. Ferguson, Continental Oil Co.; W. K. Warren, Warren Petroleum Corp.; J. C. Donnell, II, The Ohio Oil Co.; C. L. Henderson, Vickers Petroleum Co.

On the board of directors, the following are new members: R. G. Follis, Standard Oil Co. of California, for the Pacific Coast refining group; F. M. Mayer, Continental Supply Co., and Ted Sutter, Baker Oil Tools Co., Inc., for the supply group; J. H. Dunn, Shamrock Oil & Gas Co., and president of Natural Gasoline Association of America, for the natural gasoline group; Sam Mosher, Signal Oil & Gas Co., and Frank O. Prior, Standard Oil Co. (Ind.), for the "at large" group; A. A. Jergins, San Joaquin Valley Oil Producers Association, and Maston L. Nixon, Texas Mid-Continent Oil & Gas Association, for the production group.

Krug Believes Production Should Be Built Up to Exceed Market Demand

J. A. KRUG, secretary of the interior, in a paper delivered at the Chicago convention of the American Petroleum Institute last week, indicated that in the latest line of thinking, some government officials have abandoned the idea of setting aside potential oil bearing areas for a war emergency. In Krug's absence, his paper was given by Ralph K. Davies, acting director of the Interior Department's Oil and Gas Division.

The new line of approach is that the petroleum industry should develop and build up a maximum efficient rate of daily production substantially in excess of market demand. Then in a war emergency no great amount of steel or other critical materials or manpower would be required.

Recognizing that this would be incompatible with proposals that imports be limited to supplying only the deficiencies in domestic demand above maximum efficient domestic production rates, Krug stated "Yet if this (domestic maximum efficient production rate) is to be the sole criterion for imports, obviously there would be small likelihood of attaining a reserve productive capacity."

While the Interior Department secretary mentioned no specific figure as the desirable amount of excess maximum efficient domestic productive capacity, he pointed out that we entered World War 2 with nearly 1,000,000 bbl. excess capacity and was pessimistic that domestic production would ever again provide such an excess. In this connection, some observers expressed the opinion that military authorities are now talking about a military reserve of 2,000,000 bbl. daily for the next emergency.

Supreme Court Rules Champlin Line Subject to ICC Regulation

WASHINGTON. — In a five-to-four decision the Supreme Court held the products pipe line of Champlin Refining Co. a common carrier subject to the Interstate Commerce Act although it has never been asked to carry oil for others and has no physical connections nor facilities to do so.

The line runs from the Champlin refinery at Enid, Okla., through five states serving company terminals at Hutchinson, Kans.; Superior, Neb., and Rock Rapids, Iowa, and moves only company-refined products. The Interstate Commerce Commission ordered the company to file valuation data, and the company sought an injunction on the ground that it is not a common carrier as defined by the act, and claimed the exemption given the Uncle Sam crude pipe line in the original Supreme Court pipe-line cases which held that line was not engaged in transportation in simply carrying its own oil from its own wells to its own refinery.

The majority of the court held that the controlling factor is transportation of commodities from state to state, not whether the line is a common carrier under the common law, because the statute is meaningless in using a broader definition. The manufacturing process has been completed and the oil is not moved for the company's own use but to put in the interstate market at an economic advantage, the majority said, pointing out that Champlin quotes prices f.o.b. Enid plus the rail freight differential.

Denying Champlin's plea that such application is unconstitutional because it converts a private carrier into a public utility, the majority said the power of Congress to regulate interstate commerce is broader than the technical definition of a common carrier, and that there is no taking of property without due process of law because the I.C.C. has not ordered the company to do anything except file information and the line may never be asked to carry property for others.

Four justices dissented on the ground that the Champlin line is similar to the Uncle Sam line and Congress has not changed the law since that decision. They said other pipe lines were held to be common carriers in form if they were so in substance by reason of the fact that they carried oil offered by and bought from others, and the evil sought to be remedied by the act was mastery of oil through control of gathering facilities. If the line does not carry the oil of others it is not engaged in transportation within the meaning of the act, the minority declared.

THIS 1946 WEEK

S	M	T	W	T	F	S

NATURAL GAS—Carthage gas field gets new proration schedule from Texas Railroad Commission. . . . Action follows court ruling holding commission order shutting down 30 wells invalid. . . . ¶I.G.A.A. announces closing of Mid-Continent office in Oklahoma City December 1. . . . ¶Amarillo Oil Co. reveals plans for 16-in. gas pipe line from Panhandle field to Amarillo. . . . ¶Supreme Court refuses to review ruling on FPC directive to Cities Service Gas Co. to reduce rates in 265 cities and towns. . . . ¶A.P.I. resolution asks Congress to curb powers of FPC. . . .

TRANSPORTATION—Sunray Oil Corp. will construct 83-mile 8-in. pipe line from its Allen, Okla., refinery to Drumright. . . . Line will connect with Great Lakes Pipe Line Co. system, speeding delivery of Sunray's products to North and Northeast. . . . ¶L. H. Prichard, president of Anderson-Prichard Oil Corp., calls for continued use of "Little Inch" line as aid to Southwest refiners. . . . Disposal hearing on wartime lines slated to air views of Government and industry on proposed sale. . . . ¶Supreme Court rules in 5-to-4 decision Champlin Refining Co. interstate pipe line makes Champlin a common carrier under Interstate Commerce Commission jurisdiction. . . . Champlin attorneys indicate they will ask for a rehearing.

INTERNATIONAL—Russia, ignoring Austrian nationalization laws, seeks to expand control over oil industry. . . . Observers believe country headed for state control of resources. . . . ¶Brazil reported awaiting construction of two new refineries. . . . Two big wells increase hope country eventually may be self-sufficient in crude production. . . . ¶Compromise wage agreement ends Colombian oil strike. . . . Walkout affected more than 10,000 workers, lasted 2 weeks. . . . ¶Experts think Russia eager to join proposed International Petroleum Commission provided for under Anglo-American oil agreement. . . .

EXPLORATION—Texas School Land Board to open bids December 3 for mineral leases on 326,788 acres, largest board offering in history. . . . ¶Largest single area of federally owned land ever offered industry, 20,127 acres in North Central Montana, submitted to bidders. . . .

LABOR—Sinclair announces $31.20 initial monthly wage boost in agreement with Oil Workers International Union, C.I.O. . . . Quarterly reviews of cost-of-living changes will be reflected in new wage scale. . . . ¶More oil companies join list of concerns providing employes with voluntary cost-of-living wage increases or bonuses. . . .

IMPORTS—Continued increase in petroleum-products imports noted for September. . . . Cumulative total reaches 103,138,000 bbl., 21,997,000 bbl. above figure for same period in 1945. . . .

PRICES—Sun Oil Co. announces 5 to 20-cent increase for crude oil in East Texas, Gulf Coast and Louisiana fields. . . . ¶Sinclair Prairie meets Sun's higher prices in fields in which both concerns compete for crude. . . . ¶Humble announces crude increase throughout its system, leading observers to expect general increases by other companies. . . .

GOVERNMENT—Secretary of Interior J. A. Krug tells A.P.I. Government dropping idea of setting aside potential oil areas for war emergencies. . . . New approach favors development and production under maximum efficiency rate to provide country with huge reserve. . . . ¶Supreme Court to rule soon on extent of FPC authority. . . .

IN MEMORIAM

Tribute to those from the petroleum industry who did not return from World War II was paid at a general session of the American Petroleum Institute in Chicago last week. Color guard and choir music were by the Great Lakes Naval Training Station

A.P.I. Officially Adopts Public-Relations Program Presented at Chicago

*by Robert T. Haslam**

This is the general outline of the public relations program officially adopted by the American Petroleum Institute. The material was originally presented as recommendations in Part 2 of the author's report made as chairman of the 17-member advisory subcommittee on public relations. Part 1 of that report discussed the factual data in the public-opinion survey. This survey was explained in the November 16 issue of The Oil and Gas Journal.

THE three critical issues are: (1) The impression that the industry holds back new developments; (2) the impression that the companies get together to fix prices; (3) the impression that the industry is a monopoly and that there is not enough competition.

Here are the vital issues on which only 42 per cent of the people, on the average, support the oil industry. We know that the job of meeting these issues can't be done effectively from some central headquarters alone or just by getting out news releases, direct mail pieces or advertising. We know it takes salesmen to sell products. We need salesmen, too, to sell these important ideas.

Products-Ideas

We must have grass-roots action to merchandise the friendly ideas and impressions we put out to offset and counter the critical ones the public now has. We are going to need personal contact to arouse interest and to stimulate action. To do the job right, we plan to put a small group of trained public-relations merchandisers into the field.

These men have a background of practical experience in public relations. They will have specific assignments and will be required to work exclusively on matters approved in the national program.

Working with Companies

First of all, they will work closely with individual companies in each territory to encourage the most effective use of their own facilities and resources. If the individual companies do not make the most of their opportunities for telling their own story, no one else can do the job for them.

Working within assigned districts, these public-relations field representatives will be counselors to all members of the industry on industry public relations matters. They will spark-plug the first important phase of the program—which is to make good use of all the effort the industry itself can put behind this program.

Second, the public relations field men will:

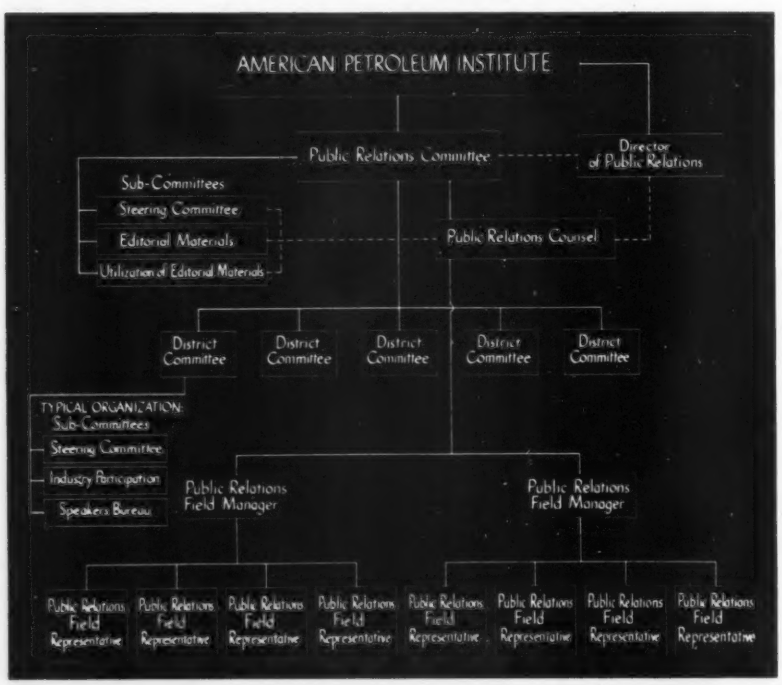
1. Work with all industry trade-association groups to capitalize on their local and regional facilities.

2. Establish and maintain the identity and importance of the program theme with trade paper editors.

Working with Influence Groups

Their third job will be to get out and merchandise our program to key people. The public-relations field representatives will seek to reach directly or indirectly as many as possible of the 112,000 people who are the top thought leaders throughout the country: Editors; columnists; authors; radio-program directors, producers, and commentators; ministers; educators; farm, civic, and business leaders.

They will supervise development of the over-all program in their respective districts — distributing factual material, handling inquiries, promot-



This chart shows how the various features of the public-relations program will be coordinated to insure the success of the program. Members of the public-relations standing committee are: B. I. Graves, Tide Water Associated Oil Co., chairman; K. S. Adams, Phillips Petroleum Co.; J. F. Drake, Gulf Oil Corp.; W. H. Ferguson, Continental Oil Co.; Alexander Fraser, Shell Oil Co., Inc.; Walter S. Hallanan, Plymouth Oil Co.; Jake L. Hamon, Cox & Hamon; Eugene Holman, Standard Oil Co. (N. J.); B. Brewster Jennings, Socony-Vacuum Oil Co., Inc.; W. A. Jones, Cities Service Oil Co.; J. Howard Pew, Sun Oil Co.; J. French Robinson, East Ohio Gas Co.; Reese H. Taylor, Union Oil Co. of California; Albert E. Watts, Sinclair Oil Corp.; Earle W. Webb, Ethyl Corp.; Robert E. Wilson, Standard Oil Co. (Ind.); and Ralph T. Zook, Sloan & Zook

*Vice president, Standard Oil Co. (N. J.), New York.

ing local campaigns and special events.

Petroleum Is Progressive

To put this program across properly, everyone working on it must talk down the same alley—all building the same friendly impression of the industry. One of the first things we discovered in studying the problem was the lack of handy, ready-to-use data on specific issues.

Three Briefs

We plan to overcome this handicap by getting out what we call an editorial background brief on each subject where we will need public understanding and public support, starting the first year with the three most important issues. As the program develops, there will be an editorial brief to meet each of the 14 main specific issues.

These editorial briefs will be comprehensive and authoritative. They will be the source from which much other written material will flow. They will be designed for information and reference use by people both inside and outside the industry—editorial and feature writers, authors, columnists, commentators, lecturers, and others who reach out to the general public.

Radio

Radio will have a part in this program. We plan to handle this in three ways: First, through cooperation we want to make the best possible use of radio facilities now employed by the industry locally and nationally. We have an important opportunity to work the progressive theme into established company programs wherever feasible.

After the field program is under way and grass-roots action is set in motion, a series of transcriptions will be merchandised to help tell the industry story locally. Then, and only then, would it be feasible to consider a high-caliber network program.

Advertising

We have not forgotten or neglected the public-relations possibilities of advertising. We agree that a distinctive, hard-hitting advertising campaign in newspapers and magazines could be extremely effective. Such a campaign should be a third logical step in working with printed advertising. The first two should be:

1. Work with the advertising departments of the companies to capitalize opportunities for using the progressive theme.

2. Incorporation of the theme in future company sales promotion, whenever it may be feasible.

When a national industry campaign is used, to be most effective it should serve as a spearhead advertising—as the pattern for local campaigns and adaptable for reproduction in many forms. Such a campaign could not succeed without long preparation within the industry.

Each dollar spent for advertising should reenforce every dollar spent on the field program and in getting out editorial material. But, for advertising to be truly effective, the field program and the editorial briefs projects must come first. That is the major reason why we are not recommending a national advertising campaign now—the industry is not ready for it.

Special Event

Finally, we will propose from time to time a number of dramatic special events that will help make the industry stand out in the public's mind as progressive and that will build liking for the industry. But we recognize that it is important to first lay the groundwork with a solid grass-roots program. That kind of a background is necessary to set the stage for special projects.

Summary of Specific Steps in Program

First, with the war over and with a new set of conditions facing us, we must get away from emphasis on the industry as basic or essential.

Second, we propose to replace that idea by establishing the character of the oil industry as progressive.

Third, we will work first on three specific issues: (1) the public impression that we hold back new developments; (2) the impression that we fix prices; (3) the impression that we are a monopoly lacking competition. These are vital issues on which we have the support of only 42 per cent of the people!

Fourth, we will send a small staff of well-trained public-relations merchandisers into the field to sell the program and to help the companies get the most out of their facilities for making friends for the oil industry.

Fifth, through a series of authoritative editorial background briefs, we will fill the need for basic on each specific issue.

Sixth, we will circulate these briefs where they will do the most good—to writers, commentators, editors and thought leaders—and as source material throughout the oil industry.

Seventh, from this basic material we will get out pamphlets, booklets, leaflets and special studies—each project aimed for a specific audience, whose attitude on the issues is now known from our survey.

Eighth, patterns for both radio and publication advertising will be worked out, for use when they can be followed up most effectively.

Ninth, we will develop a schedule of special events which will dramatize the progressive character of the oil industry.

Cumulative Effect

Each step in the program builds logically on the foundation of preceding steps. Each step is designed to reenforce the public characterization of the industry as progressive and to establish that impression firmly in the public mind.

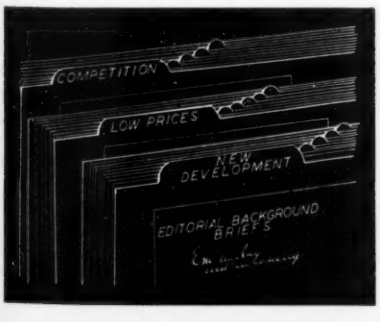
Each step helps to raise the bulwark of understanding that will offset pressure against the industry. Each step, we believe, represents positive, constructive forward-looking action that should challenge and inspire all of us who are looking for specific answers to specific problems. This program will be only as effective as the organization which we set up to execute it.

Organization

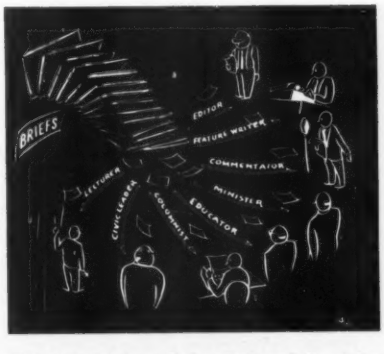
Operation of the program will be under the direction of the public-relations committee which will establish policy and guide activities, with the approval, of course, of the president and board of directors of A.P.I.

To further the program, district committees will be set up, conforming to the PAW districts, with slight variations in certain sections of the country. It is recommended that we have subcommittees of the main committee and each district committee.

The subcommittee agreed that the most practical way to carry on the program is through the utilization of a professional public-relations firm.



Through authoritative editorial background briefs will be found the need for basic material on each specific issue



Editorial briefs will be designed for information and reference use by non-oil people who write, talk to, or lecture for the general public

International

WORLD-WIDE OIL DEVELOPMENTS

Brazil Seeks Crude Self-Sufficiency; More Refineries Are Planned

RIO DE JANEIRO.—At least two refining organizations here have plans under way for construction of refineries.

One, the National Brazilian Refining Co., with an authorized capital of 50,000,000 cruzerios (about $2,500,000), is backed by some government capital. The other, of which Dr. Salgado Filho, former Brazilian Minister of Aeronautics, is president, is backed entirely by private capital. Moreover, Filho's organization reportedly has large capital interests behind him. At present it is capitalized at 60,000,000 cruzerios (about $3,200,000).

Brazil's interest in refinery activity has been heightened by the recent completions of two oil wells in the Candeias field, located north and west of Sao Salvador. The discovery well came in September 16 and flowed at abcut 1,750 bbl. a day through a ¾-in. bean.

The search for oil is being conducted under Brazil's Conselho Nacional de Petroleo (National Petroleum Council). The United Geophysical Co., S.A., is doing the geophysical work in the Bahia basin. DeGolyer & MacNaughton is doing surface geology. Geophysical Service, Inc., recently put a crew in the Amazon basin.

Drilling & Exploration Co., of which J. E. Brantly is president, has the drilling contract. Depth of the last well to be brought in in Candeias field was approximately 2,555 ft. On a flow test, this well showed a daily potential in excess of 1,000 bbl. daily. At present, Brantly is in the United States.

It is the hope of Brazilian government officials that eventually this country can be self-sustaining insofar as indigenous crude is concerned.

Currently, Brazil has only two refineries. They are: the Industrias Matarazzo de Energia, S.A., at San Paulo, which has a daily skimming capacity of about 2,500 bbl.; and Ipiranga, S. A. Cia Brazileria de Petroleas, at Rio Grande, with a daily skimming capacity of about 1,800 bbl.

Annual imports are approximately 10,000,000 bbl. and are distributed by petroleum importing companies, a good many of which are affiliated with major U. S. oil companies.

While Brazil's petroleum industry has been nationalized, indications are that the revised constitution approved last September will provide for the reentry of capital from other countries. However, the petroleum law has not yet been promulgated and chances are that until it is, nothing much will be done insofar as the construction of additional refineries are concerned. Then, there is the factor that new construction depends largely upon the availability of materials from the United States.

In the first 7 months of this year, imports of gasoline and other refined petroleum products amounted to 577,382 tons (3,941,674 bbl.), compared with 1945 imports for the same 7 months of 526,377 tons (3,684,639 bbl.)

Crude imports for the same period in 1946 totaled 19,477 tons (136,339 bbl.) compared with only 170 tons (1,190 bbl.) for the first 7 months of 1945. Available figures show that for the first 7 months of 1946, kerosene imports amounted to 44,394 tons (310,758 bbl.) compared with 29,946 tons (209,622 bbl.) for the same months in 1945.

As one step in the expanded petroleum economy of Brazil the State of Bahia is planning to build a school to train nationals along production and refinery lines.

Saudi Arabia Operations Discussed Before Nomads

LOS ANGELES. — Twenty - three foreign guests attended the November 13 meeting of the Los Angeles Nomads which was featured by a discussion of operations in Saudi Arabia by Phil C. McConnell, manager of the production department, Arabian American Oil Co. who is vacationing on the West Coast.

Plans were announced for a Christmas party, tentatively scheduled for December 7 at which time new officers will be elected, if appropriate arrangements can be made by the executive committee. Roy E. Rasher was introduced as the fulltime secretary for the Los Angeles chapter.

R. P. McKey, recently returned after 5 years service in the Army Air Forces retiring as a major, was introduced as his new business associate by J. Howard Tinkham, California advertising manager for The Oil and Gas Journal and Petroleo Interamericano.

Foreign guests included: N. J. Alleman, Kuhn Calvert, and E. R. Kelly, Attock Oil Co., Ltd., India; T. A. Connor, R. H. Connor, Harry D. Huskey, Fred C. Lay, J. E. Sligh, C. H. Strickland, C. N. Williams, and Jack Walsh, all of Iraq Petroleum Co., Ltd.; C. H. Majors and B. L. Coker, Danish American Exploration Co.; S. J. Liu, C. K. Suez, and H. S. Yao, Chinese Petroleum Corp.; Walter L. Little, Tropical Oil Co.; Warren L. Ellison, The Texas Co. of Colombia; J. O. Lederman and G. Salvy, S.N.P.L.N. (France); George W. Akers, National Mining Corp., Ltd., Trinidad; Spencer T. Taylor, Socony-Vacuum Oil Co. of Venezuela; and Orlando G. Webb, Arabian American Oil Co.

Russian Province Doubles Natural-Gas Consumption

Consumption of natural gas in Kuibyshev Province, U.S.S.R., which jumped from 21,000,000 cu. ft. in 1945 to 24,800,000 cu. ft. in the first 6 months of 1946, is expected to increase further in 1947.

According to the Foreign Commerce Weekly, published by the Department of Commerce, a new 19-mile gas pipe line to supplement existing facilities is expected to be completed by the end of this year, connecting Pokhvistnevo with a recently discovered gas deposit near the village of Yablonya.

Jersey Executive Outlines Foreign Investment Basis

NEW YORK.—Stating that the future course of American business abroad is squarely up to the businessman himself, Leo D. Welch, treasurer, Standard Oil Co. (N. J.), told members of the National Foreign Trade Council here that "our need is to combine our private and government efforts to convince the governments and national capitalists in countries abroad that American investment will supplement their economy, not impinge upon it."

Welch spoke at the N.F.T.C.'s thirty-third convention, November 11-13, and made a special plea for fair treatment of United States capital in foreign countries. He coupled this plea with the statement that American concerns should make greater efforts whereby executives would participate in U. S. Government affairs. Furthermore, American concerns, he said, should go so far as to place their employes on loan to Government in such a position that they might weather their terms financially in that government salaries are still too low.

"Business has fared well in our country and if it is not disposed to make this type of sacrifice, then our Government policies will be dictated by men who do not speak the language of business. . . ." Welch added that "men in government" should apply to domestic as well as foreign affairs.

Rather than remain in a defensive position, as has happened much of the time in the past, the Jersey Standard executive favored a positive approach and a positive program. He said:

"If American capital is to deal effectively with foreign governments, it must attune its planning and its policy-making to those of our Government which in turn must reciprocate in the same spirit.

"Let us turn to the emigration of our capital. While it is ready to take a normal degree of risk, naturally it must have a reasonable assurance of the opportunity to produce without fear for its safety. The many who expect to export that capital, however, cannot hope to have a set of satisfactory conditions served up to them without going after them, and in turn offering a fair basis to the foreign countries.

"The 'fair basis' comprises a type of operation that will help a country progress and a willingness to reinvest a reasonable proportion of earnings there, besides, of course, taking out a fair return. But business judgment and a readiness to cooperate must exist in our Government as well, if the collaboration of other countries is to be obtained."

Wage Increase Settles Colombian Labor Dispute

Colombia's 2-week-old strike affecting more than 10,000 oil workers was settled last week with the acceptance of a compromise wage-increase offer and the granting of other worker demands.

Settlement followed action of the government in declaring the transportation of refined petroleum products a public utility, enabling the government to guarantee delivery of petroleum products while the strike was in progress.

Principal company affected by the dispute was Tropical Oil Co., largest producer in Colombia and a subsidiary of Imperial Oil, Ltd.

Transportation Difficulty Slows Peru Development

WASHINGTON.—With a pipe line over the Andes still "a dream of the future," development of new fields in Peru's Montana region is being hindered by a lack of practical transportation.

Most practical route at present, according to a study by the National Geographic magazine, is by boat or raft down tributaries of the Amazon to Iquitos and from there by boat or ship to the Atlantic. Iquitos can be reached by ocean-going ships that draw up to 14 ft. and ascend the Amazon 2,300 miles westward.

The Montana region, rich in mineral resources, is a remote area which contains half the republic's 500,000 sq. mi. but only 4 per cent of its population. Peru's northern coastal desert long has yielded petroleum in large volume, but oil was not discovered in the eastern area until 1939.

Solid-Fuel Shortage Spurs French Gas Development

CLEVELAND. — Shortage of solid fuels in France is providing the impetus for exploration and active development of gas fields south and west of Toulouse, according to John B. O'Connor, executive vice president of Dresser Industries, Inc., who just returned from a 4-week trip to England and the Continent.

O'Connor reported a sizable gas field development under way in southern France and considerable activity in Czechoslovakia. Structure of the new French field, he said, was worked out in 1937 and the first well brought in early in January 1939. "Today, with the war behind them, the French, through a company financed jointly by government and private capital, have completed a 12-in. pipe line to Toulouse, a 5-in. line to Tarbes, and have others under construction to neighboring industrial centers," O'Connor said.

International

Russia Still Ignoring Austrian Nationalization

VIENNA.—Up to the day the Allies sign a peace treaty with Austria, oil will play a major role.

Meanwhile, indications are the Russians will continue economic penetration of this country with the hope that by the time active peace treaty discussions get under way, economic changes will be too permanent to alter.

These statements, made here by an authoritative source, explained that the Soviet, to date, has paid no attention to Austria's nationalization laws, holding that any part of this law which adversely affects her is not legal.

Viennese lawyers have ruled that the legal implications of the nationalization law are in order. However, here is where some oil company representatives disagree, holding that when the nationalization law was passed, the Austrian Government had no idea of the large payments which would have to be made for expropriated property.

So, pending financial settlements, it has been suggested that the Austrian Government postdate the nationalization program, a suggestion which will probably meet the Soviet approval—but for entirely different reasons.

Looking at the over-all oil picture here, Russian domination has not changed. In fact, it appears that the trouble U.N.R.R.A. had with the Russians over making oil available for the distribution of much-needed food earlier this year, is slated to return in another form. This time, it will be the winter need of fuel oil in the United States' zone of occupation. In fact, this situation has already reached the point where the U. S. military authorities may have to provide for much of the demand.

And while this is taking place, the Soviet continues to control Austria's production and supervise the refining of petroleum although Allied companies supply the necessary technical personnel on their own properties. Recently, the distribution functions were taken over by the Soviets, so that now customers are no longer supplied by the companies direct, but by the Russians.

Whatever the eventual outcome of the petroleum situation in Austria, well-informed sources here believe that the state control of natural resources and economic and industrial operations is a postwar trend which cannot be halted.

Russia Reported Interested in Joining Projected International Oil Commission

by Warren W. Burns

NEW YORK.—Contrary to popular belief, Russia would be interested in becoming a member of the projected multilateral International Petroleum Commission provided for under the proposed Anglo-American petroleum agreement. Or, if the agreement fails to be approved by the U. S. Senate, Russia would take an active part in the deliberations of an oil body which might be formed under the Economic and Social Council of the United Nations.

This disclosure was made to The Oil and Gas Journal this week by a well-informed source close to the United Nations' delegations here.

As to how Russia, whose oil is controlled 100 per cent by the government, could become a member of the international petroleum commission, under the treaty, it was pointed out that while the proposed treaty provides for the organization of a multilateral pact (Article V), no regulations were ever worked out as to membership rules, other than on a very vague basis.

Meanwhile, the treaty seems certain to be slated for a rough voyage before the Senate foreign-relations committee, a voyage which eventually may be less hazardous than currently anticipated due to an expected change in chairmanship and the fact that if the proposed treaty is not passed it is almost certain that some interested sources will instigate measures to bring oil directly under the arm of the United Nations, and in a manner that would be less desirable —even to opponents of the present treaty—than the ratification of the Anglo-American petroleum agreement.

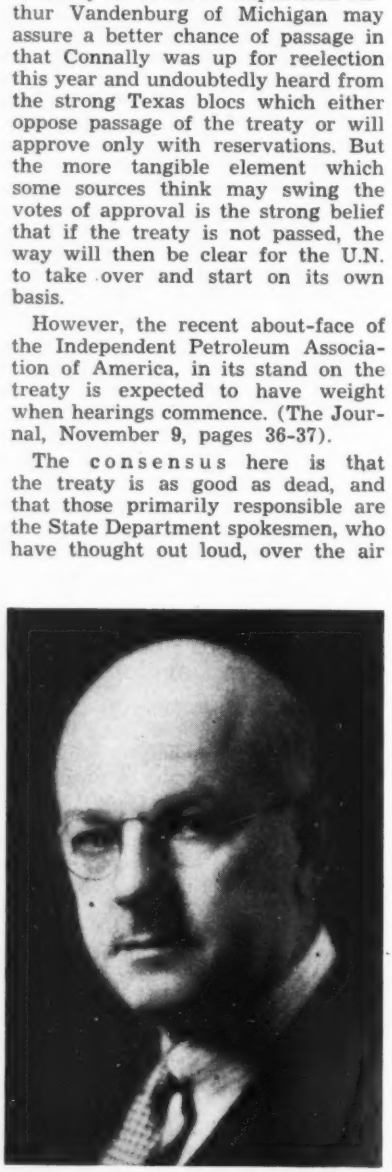
Some sources close to the treaty developments see the possibility (and in some cases, probability) of the proposed international petroleum commission being affiliated, in some sort of an advisory capacity, with the U.N.'s Economic and Social Council, and state that it would be much more desirable this way than to have new rules drawn up and another course chartered, as might be the case if the oil treaty does not win Senate approval.

The change in the chairmanship of the Senate foreign-relations committee, before which the proposed oil treaty now lies, from Democrat Tom Connally of Texas to Republican Arthur Vandenburg of Michigan may assure a better chance of passage in that Connally was up for reelection this year and undoubtedly heard from the strong Texas blocs which either oppose passage of the treaty or will approve only with reservations. But the more tangible element which some sources think may swing the votes of approval is the strong belief that if the treaty is not passed, the way will then be clear for the U.N. to take over and start on its own basis.

International

However, the recent about-face of the Independent Petroleum Association of America, in its stand on the treaty is expected to have weight when hearings commence. (The Journal, November 9, pages 36-37).

The consensus here is that the treaty is as good as dead, and that those primarily responsible are the State Department spokesmen, who have thought out loud, over the air waves, and mapped global oil thinking far ahead of what the U. S. oil industry visioned when it gave practically unanimous approval of the treaty signed in London in September 1945.



Joseph E. Pogue, who favors Anglo-American petroleum agreement

Joseph E. Pogue, vice president of Chase National Bank and an international authority on oil, supported the Anglo-American agreement saying "May I emphasize the similarity of the provisions of this agreement (the Anglo-American oil treaty) to the terms of the Interstate Oil Compact, after which it was patterned and the international counterpart of which it is designed to become?"

Pogue said he regarded "this instrument as of great value to independent and major companies alike, as conducive to stability of the world petroleum situation."

"The industry," Pogue added, "would appear to be fortunate in having an agreement in which the needs for international coordination are met without the use of controls or regulations. A careful reading of the text of the treaty will indicate that under its provisions the industry is under no compulsion to take any action whatsoever which it deems undesirable.

"If the latest efforts of the association (I.P.A.A.) should result in rejection of the treaty, I am afraid that the final outcome might be a new agreement drawn at some future date in time of economic crisis which would be an improvised emergency measure far less favorable to the interests of the industry and the independent producer than the present agreement."

Pogue said that as far as he was aware "the members of the State Department have never made any statement contrary to the intent of the agreement as I understand it. In a recent broadcast, however, certain statements were made relative to other actions which might be taken in connection with the formation of a multilateral agreement or by the U.N., which are open to considerable question and objection on my part. These statements do not pertain to the merits or demerits of the Anglo-American petroleum agreement and should not be permitted to be prejudicial to it."

Conflicting statements made by various segments of the oil industry here in the United States concerning

the treaty have apparently puzzled British oil men and British Government oil officials. In an effort to clear up the picture, the British Government has asked the State Department's Petroleum Adviser Charles B. Rayner and Petroleum Division Chief John A. Loftus and first-hand information. Consequently, both men are now in London.

Nevertheless, the feeling among oil men here persists that the Rayner-Loftus talks are indicative of State Department thinking and that Rayner's October 29 Fort Worth speech, which was supposed to have penetrated the fog of misunderstanding, only served to emphasize the statements he made over the air in the already legendary August 17 broadcast.

The status of Loftus in Europe has at least been cleared. He went as an economic commission member to the Paris Peace Conference. And as matters to be dealt with—particularly in Italy, Hungary, and Rumania—concerned oil, it has since been stated that he was called to Paris to advise on the European oil questions. The economic commission's recommendations are now before the Council of Foreign Ministers currently meeting here in New York.

Regardless of views which may be held by Russia and France, The Journal has been told, on excellent authority, that the British Government "will go along with practically any stand taken by the U. S. Government." And this goes further than the European oil settlements, it was said, for if the U. S. Government proposes a U.N. petroleum set-up, chances are that the British Labor Party will follow suit. Right now the British are following a wait-and-watch policy insofar as United States oil actions are concerned.

Under the U.N. charter, the Economic and Social Council has powers beyond what was originally intended by the U.N. charter writers. In fact, the power is wide enough to provide for an over-night formation of an advisory oil body.

Possibly it was with the idea of being "in on the ground floor," that the International Cooperative Alliance applied for consultant status to the U.N.'s Committee on Arrangements for Consultation with Non-Government Organizations.

This application has been approved. The International Cooperative Alliance and its affiliated International Cooperative Petroleum Association are now consultants to the U.N. Economic and Social Council. How freely the U.N. council will utilize the consultant status is anybody's guess.

And in this connection it is interesting to note that according to the U.N. charter the Economic and Social Council has the power to create as many commissions as it may deem necessary. The commissions may be either of a temporary or of a permanent nature. To date, the members on commissions affiliated with this U.N. council have been named by the governments concerned. However, this does not preclude a later addition of other nongovernmental appointments.

If an oil commission were appointed by the Economic and Social Council, its duties would be to embrace fact finding and analyses; recommendations for coordination with existing agencies in its field; and recommendations to the council for action. Among the commissions now functioning are the Statistical Commission, and the Transport and Communications Commission.

Not forgetting that U.N. participation—even on an advisory basis—may well be of great political importance, it should be pointed out that the Economic and Social Council, acting on advice from either a duly appointed commission, or some specialized agency such as the International Cooperative Alliance, has the power to prepare drafts of international conventions to be submitted to the General Assembly. In fact, plans for the organization of an International Trade Organization will be drawn up next year under the sponsorship of the U.N.'s Economic and Social Council.

Whether the proposed International Trade Organization will deal with oil is another matter for anybody's guess. However, a high-ranking U.N. official said the London preparatory talks, now in progress for the 1947 meeting, "hadn't even mentioned oil."

At a 3-day meeting of the National Foreign Trade Council in New York November 11-13, the theme most often expressed, usually by State Department officials, was that while the emphasis in the United States has been exports, in past years, the future will see imports playing a more important role. And indicative of the fact that this was not merely an offhand opinion was a statement that petroleum was one of the commodities which would have to be imported in ever-increasing quantity. If for no other reason, this statement is of importance as indicative of government thinking.

But returning to the power of the U.N.'s Economic and Social Council, and what might be done here insofar as the international subject of oil is concerned, the charter provides that this council can call international conferences on all matters falling within its scope. And the matters which fall within its scope are almost limitless. Petroleum, most certainly, might be included.

The powers of the Economic and Social Council should not be treated lightly. In a recent publication, "The United Nations," by Louis Dolivet—a publication whose proofs were read by U.N. Secretary General Trygve Lie and Russia's Chief U.N. Delegate Andrei A. Gromyko, as well as others—is the following statement:

"The importance of the Economic and Social Council in the whole structure of the United Nations is illustrated by the fact that outside of the permanent organs it is the only one that meets three times a year, and also that provisions are made for many extrordinary sessions of the council. Extraordinary sessions must be held whenever they are requested by the General Assembly or by the majority of the members in regular session."

U.N. Disclaims Plans For Oil Adviser

REPORTS that the United Nations soon will designate a fulltime petroleum adviser as a possible preparatory step in plans for a world oil authority have been declared by United Nations officials to be "without foundation." These reports were published in The Oil and Gas Journal, October 26, page 80.

In a letter to the Journal, Andrew W. Cordier, executive assistant to Trygve Lie, secretary general of U. N., said he had been authorized by Lie "to state that no proposal for the creation of an international oil authority has been submitted by any of the members of the United Nations.

"Consequently, the secretary general has not made any plans for the provision of funds which such a project would entail, nor has any offer of appointment, either on a temporary or provisional basis, been made to any person or persons referred to or named in this article." The statements made, Cordier said, "which refer to action allegedly contemplated by the secretary general, are without foundation."

In the October 26 article, W. B. Uderski, now chief of the fuel division of the United Nations Relief and Rehabilitation Administration, was reported unofficially to be slated for the appointment as U. N. petroleum adviser.

WASHINGTON WATCHING

BY HENRY D. RALPH

Import Tax Reductions

WASHINGTON.—Reduction of excise taxes on imported refined petroleum products will be considered by the U. S. Government in negotiating reciprocal trade agreements with 18 nations next year.

The list of possible duty concessions includes thousands of items in the tariff act and a number of special excise taxes on imports. Publication of this list does not necessarily mean that cuts will be made in all the items, but it is notice to American industry that reductions will be considered in exchange for concessions from other nations in the form of lower duties and removal of barriers to international trade.

Crude petroleum is not included in the list of possible concessions. The tax on crude was cut from 21 cents to 10.5 cents per barrel in the reciprocal trade agreement with Venezuela in 1939.

Listed for possible tax reductions are imported topped petroleum, fuel oil and gas oil, and liquid petroleum asphalt, also cut from 21 to 10.5 cents per barrel in the Venezuela agreement but subject to further reduction of as much as 50 per cent; also all liquid petroleum products not specially mentioned, which includes kerosene cut from 21 to 10.5 cents per barrel in the Mexican agreement in 1943 and subject to a further reduction, and naphthas which are still 21 cents per barrel.

Other Products Listed

Other petroleum products listed for consideration are gasoline and other motor fuel, now 2.5 cents per gallon; lubricating oil, taxed at 4 cents per gallon when imported; and paraffin wax taxed at 1 cent per pound.

Hearings on all the possible duty cuts will open in Washington January 13 and may last several weeks. All interested parties may file briefs with the Committee for Reciprocity Information and give notice of intention to appear at the hearings by December 21.

Actual negotiation of the multilateral trade agreement will begin in April and may be a protracted process. The State Department has not disclosed in detail what concessions it will ask from any of the other countries, but American traders may make suggestions for removal of specific trade barriers.

The only one of the 18 countries particularly interested in U. S. duties on petroleum products is the Netherlands, which sends considerable refined products from the N.W.I., which doubtless accounts for the fact that concessions will be considered only on refined products and not on crude petroleum. However, any duty cuts granted the Netherlands will apply to imports from any source.

Preferable Arguments

DOMESTIC oil producers can be counted on to raise vigorous opposition to a cut in import taxes on petroleum products as proposed in the negotiations with 18 countries, but the outcome will not depend entirely on how good a case they make.

This is not to say that arguments of domestic producers are ignored in tariff bargaining (though sometimes it has appeared that way), but that many other considerations are involved. Much depends on how strongly the Netherlands (only one of the 18 particularly interested) holds out for tax cuts on specific petroleum products, and what duty concessions she offers in exchange. This is a matter of across-the-table negotiating behind closed doors, with scores of commodities the pawns in the game of reducing world trade barriers. When it is all over—at least 6 months hence—industry will never know which particular duty cuts were swapped for what specific foreign concessions to U. S. trade, and whether the failure to cut a duty was due to the vigorous opposition of domestic producers or because the foreign nation wasn't so much interested in that concession or refused to get it by giving up something demanded by the U. S. negotiators.

National policy is also an overriding factor in tariff bargaining. Up until November 5 it was safe to say—based on statements of State Department officials—that our national policy included drastic slashing of all trade barriers and greater imports of petroleum. Now that policy may be due for some modification. Republicans generally opposed extension of the reciprocal trade law, which remains in effect until July 1948, but they are not expected to make an attempt to repeal it in the near future. However, they will keep a very close watch on the operation of the law and the 18-ring negotiating circus next spring. This should have considerable influence on the conduct of the negotiators.

Domestic oil producers probably will do well if they base their opposition on the plea that petroleum duties should not be changed until the U. S. has settled on a national oil policy. Hundreds of other industries will present the usual pattern of statistics on imports and comparative production costs, and the negotiators may get rather tired of hearing that ruin will face each industry threatened with more foreign competition. On the other hand, the rate of duty on oil imports might become an insignificant factor if we had an established oil policy which, for example, fixed import quotas on the basis of a ratio between domestic consumption and maximum efficient rate of production.

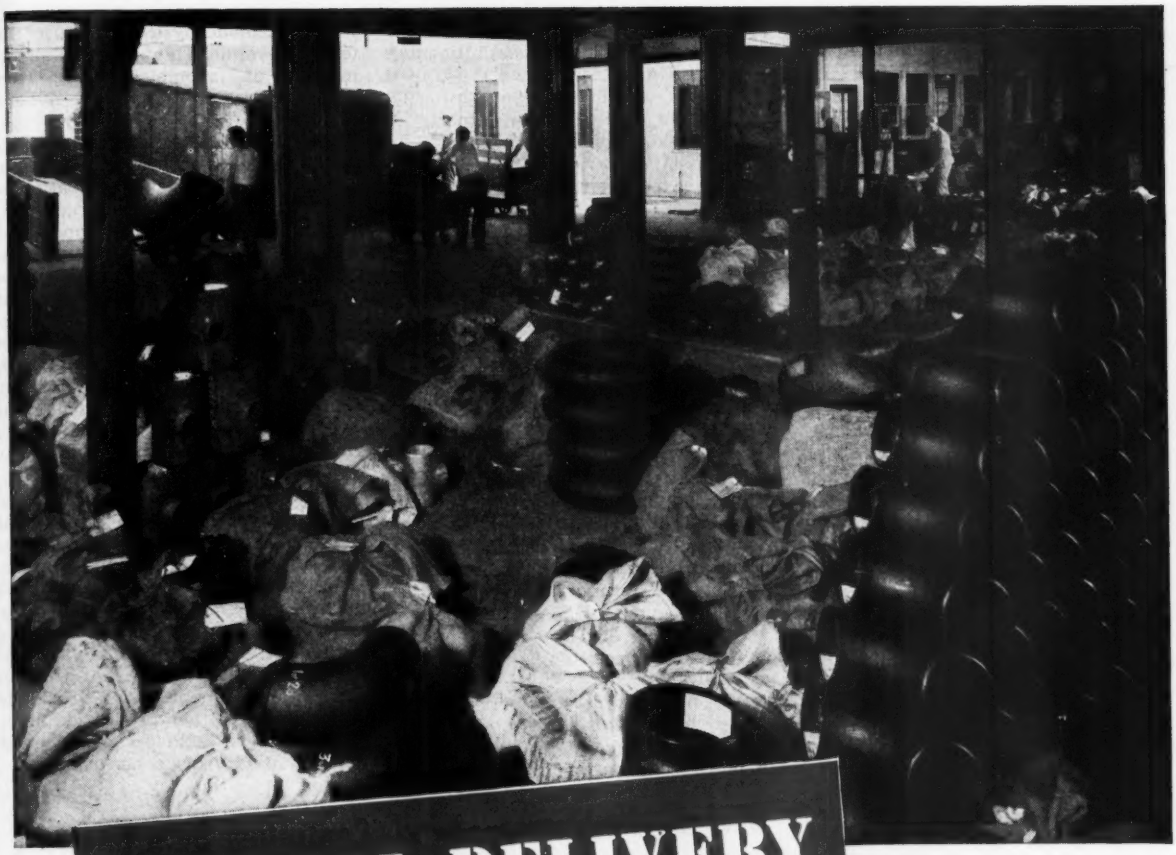
Oil companies interested in exports and foreign operations will also have an opportunity to tell government officials what concessions they would like to have from any of the 18 nations in the way of lower duties, internal taxes, import quotas, port charges, and other barriers to international trade. The State Department has a pretty good idea what it will ask of the other countries but welcomes specific examples of hardships on American traders.

The Big-Inch Investigation

THE big-inch pipe-line investigation which got under way this week before the House committee on surplus property is described by the committee's chief counsel as simply a step to make certain War Assets Administration is following the policy laid down in the surplus-property law.

The committee's investigating staff has not found anything sour in the procedure, the committee is not taking an adversary position against WAA, and there probably will be no specific recommendations regarding ultimate disposition of the lines, according to him. He said the committee received a number of letters, some of them "screwball," about the WAA procedure, but no formal complaints from any of the 16 bidders nor from the oil or gas industries as such. The committee goes out of existence December 31 and will then make a report to Congress covering many aspects of surplus-property disposal, and the section on the big-inch pipe lines probably will be confined to observations on general policy and will not take a position as between use of the lines for oil or gas.

However, this forecast may be upset by testimony during the 10 days or so of the scheduled hearings. Witnesses include Edgar G. Hill of the engineering firm of Ford, Bacon &



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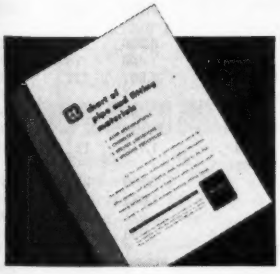

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Davis which made a survey of the lines for RFC and recommended their use for gas. All the 16 bidders have been asked to appear and give brief descriptions of their bids and their supporting engineering studies. The committee has also asked for the views of the Commerce and Interior departments and the Army-Navy Petroleum Board and Army-Navy Munitions Board.

Antitreaty Ammunition

PROSPECTS for Senate ratification of the Anglo-American petroleum treaty may be pretty slim if opponents make capital of two developments last week.

One was the admission by John A. Loftus, chief of the State Department's petroleum division, that his current European trip will include sounding out other nations on forming an international oil control organization—just the thing opponents most fear might result from the Anglo-American agreement.

The other was the revolt in the British labor party against that government's foreign policy. As reported from London a sizeable bloc of the majority party is demanding that the government "recast its conduct of international affairs so as to afford the utmost encouragement to and collaboration with all nations and groups striving to secure full Socialist planning and control of the world's resources." What the Laborites may mean by "full Socialist planning and control of the world's resources" is not spelled out, but the phrase would not be very popular with the American oil industry.

An Improving Lead Supply

STEADY improvement in the quantities of metallic lead available for production of tetraethyl fluid and automobile batteries is anticipated as a result of government action in dropping all import controls over lead.

The Civilian Production Administration is still continuing its lead allocation controls, including orders L-354 limiting production of tetraethyl lead, and L-355 limiting consumption of ethyl fluid and the octane ratings of motor gasoline. However, no lead-consuming industry has been able in recent months to purchase its full quota. As lead becomes more plentiful these quotas will mean something, and it will then be possible for CPA to raise them somewhat. CPA's legal authority is due to expire March 31, and it is the present intention to retain the lead allocation system until that date.

Not only did CPA terminate all restrictions on private importation of lead, but the Reconstruction Finance Corporation dropped its program of purchasing lead abroad (except for completing existing commitments), and the United States and the United Kingdom terminated their informal agreement under which imports to the United States were restricted to producing countries in the Western Hemisphere. This means that any American company can purchase lead anywhere in the world at any price and import it freely after paying the duty of 1 1/16 cents per pound. The RFC had been importing lead free of duty for sale to American consumers.

After OPA ceilings were removed last week the U. S. price of lead rose from 8¼ cents to the world price of 10½ cents per pound, and a further increase by the amount of the duty is now anticipated. This should make little difference to users of ethyl fluid, but may curtail consumption for some other uses. The higher price is expected to increase the flow of scrap lead, attract stocks held for higher price, stimulate domestic production of virgin lead, and result in a large increase in imports. The lead deficit in this country is so large that it will take some time before the needs of essential consumers are satisfied, but metals experts definitely expect a very considerable improvement in supplies within 2 or 3 months.

New Opportunities for Butyl

INCREASING imports of natural crude rubber have permitted the Civilian Production Administration to make further liberalizations in restrictions on its use, but synthetic rubber is still the king-pin of the industry.

While certain types of natural rubber are still almost unobtainable, the prospects for increased imports from the Far East are such that the ratio between consumption of natural and synthetic may be reversed within a few months. This will permit shutting down the higher-cost synthetic plants, thus lowering the price of the product, and by that time Congress should have determined a policy for maintaining a minimum production of American-made rubber.

Butyl rubber, an all-petroleum product, has an opportunity to seek new postwar markets under the revised rubber order. Heretofore butyl has been channeled exclusively into inner tubes because of its remarkable air-retention properties. Now limited quantities of natural rubber may be used in making tubes, but at the same time some butyl is freed for making specified other products and for experimental purposes.

Oil-Development Taxes

A SERIES of detailed rulings on application of the excess-profits taxes to oil-well development has just been made by the Bureau of Internal Revenue. They apply to abnormalities of income resulting from development of a unit of mineral property.

A single lease has been held by the bureau as the proper unit for consideration, despite the contention of some oil producers that larger units of holdings should be considered. Costs of geological and geophysical surveys are held by the bureau to be capital investments and not operating expenses, and it will allow excess-profits tax deductions only for that small portion of a survey expense required to locate the exact spot to drill a well, and development costs will not be construed to include surveys to determine the productivity of a lease.

The development period of a lease has been narrowed to the actual time between the start and completion of the initial drilling program. Where a number of wells are planned but the program is interrupted by lack of funds or other causes, the bureau will allow the entire time as the development period, but will not permit development period to include a period of settled production after initial drilling followed by renewed drilling activity in deeper sands.

Continued Gain Shown In Petroleum Imports

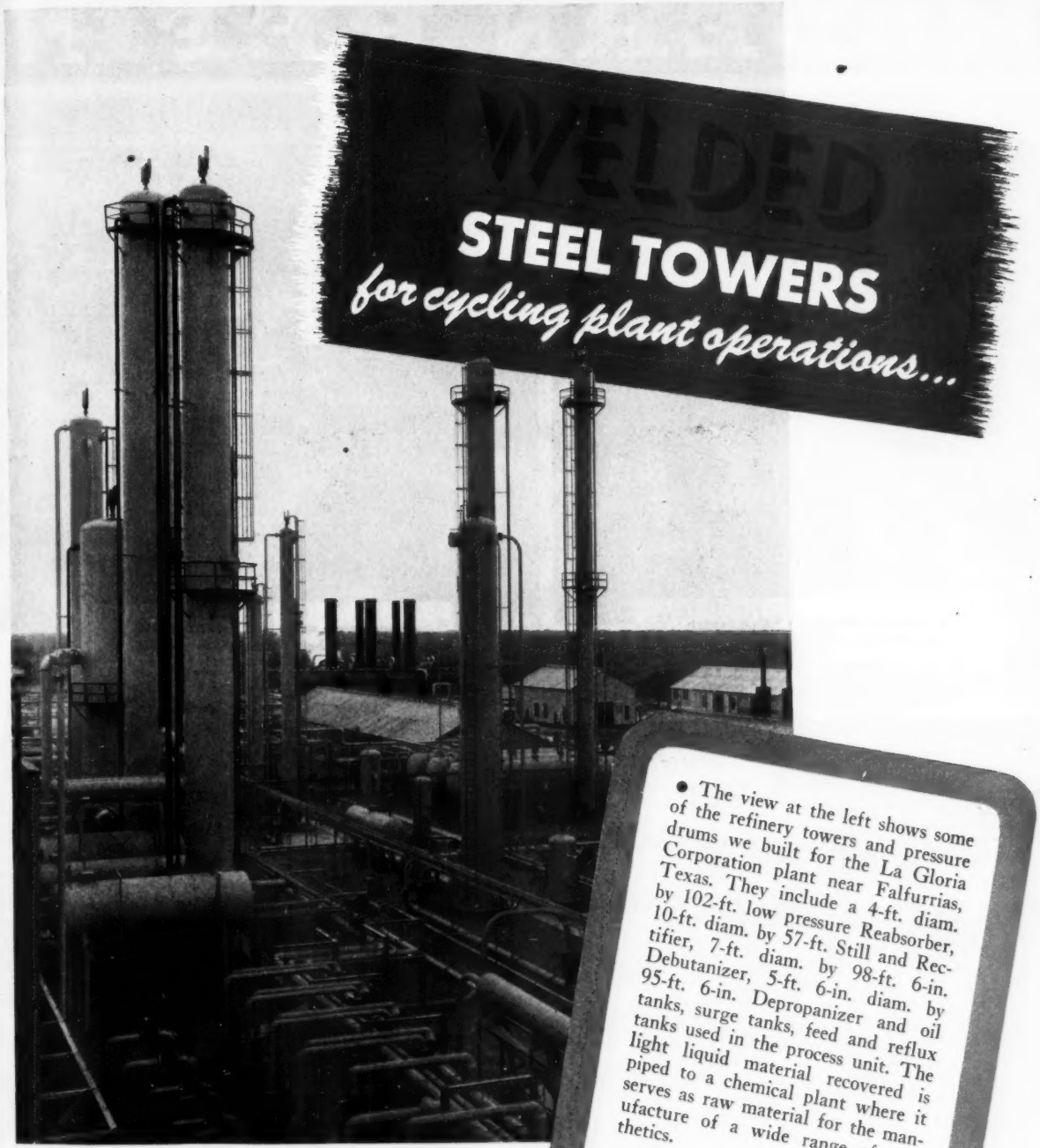
WASHINGTON. — An increase in all imported petroleum products except residual and lubricating oil was shown for September over August in a report based on Bureau of Census data and prepared by the Independent Petroleum Association of America.

September imports totaled 12,773,000 bbl., bringing the year's cumulative total to 103,138,000 bbl. compared with 81,141,000 bbl. during the same period in 1945. Of the September total, 11,339,000 bbl. was taxable for domestic consumption, with the remainder tax free for vessels or government use.

Details are shown in the following table:

IMPORTS (1,000 BBL.)

	Sept., 1946 Total	Sept., 1946 Daily average	Aug., 1946 total
Total imports	12,773	426	11,851
By products:			
Crude	8,255	275	7,632
Distillate	408	14	507
Residual fuel oil	3,807	127	3,488
Lubricants	1	...	27
Asphalt	153	5	103
Unfinished oils	149	5	94
Total refined	4,518	151	4,219
By countries:			
Venezuela	7,153	239	6,434
N. W. I.	4,083	136	3,645
Mexico	571	19	295
Colombia	958	32	942
Trinidad, Tobago	7	...	5
Others	1	...	530



• The view at the left shows some of the refinery towers and pressure drums we built for the La Gloria Corporation plant near Falfurrias, Texas. They include a 4-ft. diam. by 102-ft. low pressure Reabsorber, 10-ft. diam. by 57-ft. Still and Rectifier, 7-ft. diam. by 98-ft. 6-in. Debutanizer, 5-ft. 6-in. diam. by 95-ft. 6-in. Depropanizer and oil tanks, surge tanks, feed and reflux tanks used in the process unit. The light liquid material recovered is piped to a chemical plant where it serves as raw material for the manufacture of a wide range of synthetics.

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Atlanta, 3 ..... **2154 Healey Building**
Birmingham, 1 ..... **1536 North 50th Street**
Tulsa, 3 ..... **1606 Hunt Building**
Houston, 1 ..... **5619 Clinton Drive**
Philadelphia, 3 ..... **1615-1700 Walnut Street Building**
Washington, 4 ..... **703 Atlantic Building**
San Francisco, 11 ..... **1254-22 Battery Street Building**
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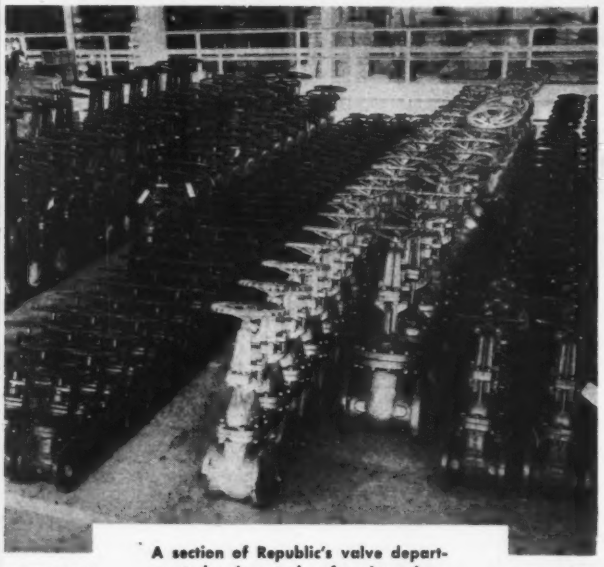
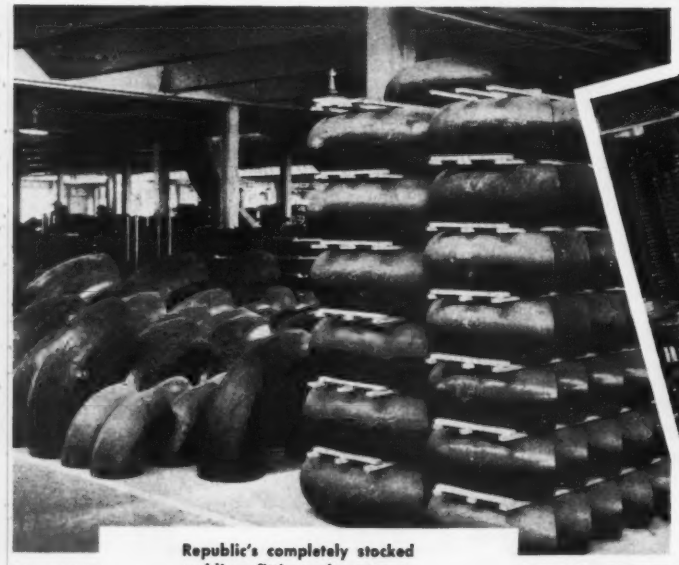


A section of Republic's valve department showing stocks of various sizes.

Plug valve stocks at Republic's new central warehouse and store in Houston.



Republic's completely stocked welding fittings department.

Partial view of flange stocks maintained at Republic's new central warehouse and store.

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* District offices and stores. † Sales Office.

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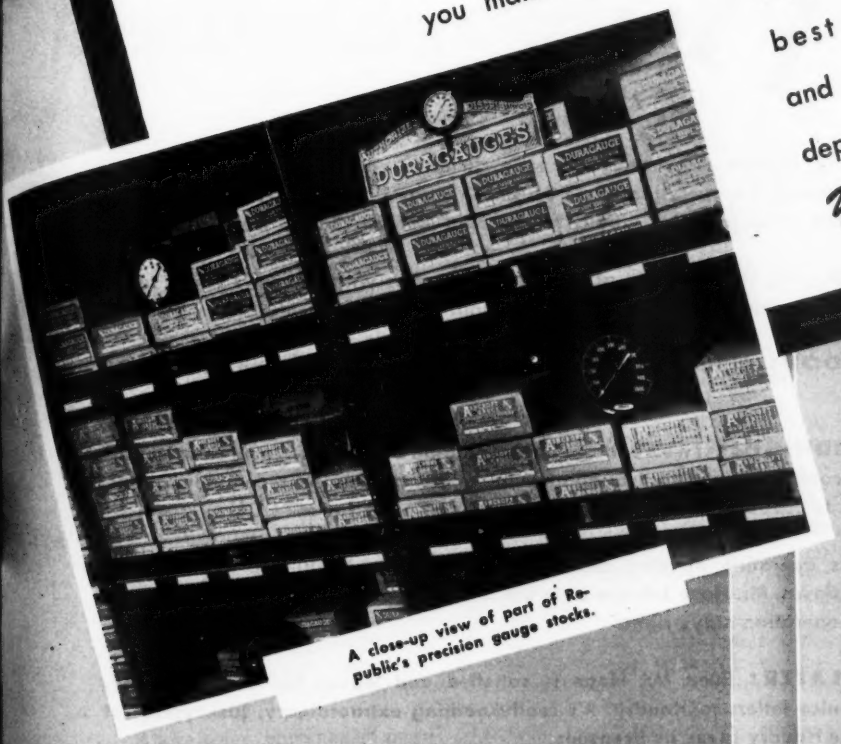

A close-up view of part of Republic's precision gauge stocks.

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Mr. Hoge goes to TEXAS

FRIDAY: Houdry Laboratories receive a long distance call from a Texas refinery, requesting assistance in the operation of a TCC unit. Wesley Hoge, able Houdry engineer, leaves by train the next day. (He would have flown but all planes were grounded.)

TUESDAY A. M.: Mr. Hoge arrives at the refinery, confers with Houdry's Texas representative and refinery management; then inspects unit.

THURSDAY NOON: At Hoge's suggestion, unit is shut down to permit examination of the reactor.

THURSDAY MIDNIGHT: Twelve hours after shut-down began, inspection of the reactor has been completed, mechanical adjustments made per Hoge's recommendations, and unit is ready to resume operation. Pretty good time, even for a TCC!

FRIDAY: Unit is operating at rated capacity and producing 1,000 B/D *more gasoline* than prior to shut-down. Mr. Hoge takes a bow but not his departure—he stays right there to make sure the operation stays right.

TWO WEEKS LATER: Even Mr. Hoge is satisfied and leaves for home. Refinery executives write nice letters to Houdry. It's really nothing extraordinary, just typical of the kind of service Houdry gives its licensees.

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Main entrance to the extensive research laboratories of Ethyl Corp. in Detroit. Occupying 26 acres, the many buildings were completed just prior to the war and are now devoted to studying the many peacetime problems of fuels, engines, and lubricants

Oil and Automobile Technologists Attend Ethyl Laboratory Open House

by Arch L. Foster

DETROIT.—Holding open house for the first time since its completion, Ethyl Corp. displayed its laboratory here to more than 1,500 technologists of the automotive and oil industries November 13-15. During this period a bronze plaque in honor and memory of Dr. Thomas Midgley, Jr., was placed in the main lobby of the laboratories. Dr. Midgley, discoverer of the antiknock effect of tetraethyl lead, died in 1944.

During these inspection trips visitors were shown the large number of different laboratories where more than 300 technologists and aides devote their time largely to research on the various interrelated problems of internal-combustion engines and their fuels and lubricants—a work symbolical of the tremendous effort and research which goes into the development of automotive equipment and the long list of products which are provided for their operation.

The laboratories encompass more than 123,000 sq. ft. of floor space. Their arrangement includes some of the most outstanding developments in laboratory technique and equipment, including the most recent progress in instrumentation and provisions for the study and observation of the operations and performance of automotive and other internal-combustion engines. Switchboards and instrument control boards are used which are more complicated than the most intricate of modern industrial control systems. The laboratories were completed, practically, at the time of Pearl Harbor and were immediately converted to the study of fuels, lubricants, and engines required for the war. It has required more than a year to reconvert the institution to the prosecution of peacetime problems.

Typical of some of the provisions made in the laboratory to aid research are the units in which engines and fuels may be operated at temperatures of —50° F., as in Arctic winter, while in another unit these operations may be carried out at temperatures as high as 145° F. Other installations may be operated under the most exacting simulated road conditions, with throttle and other engine conditions changing as frequently as once per second, to determine performance under typical operating conditions by the average driver.

Tremendous facilities for manufacturing aviation-fuel components were built and operated by the oil-refining industry during the war; the Ethyl laboratory is studying characteristics of these products to determine their properties and usefulness for future motor fuels. Engines used for research range in power from the small single-cylinder of a few horsepower to huge bomber engines producing 2,500 hp.

One interesting unit shown was an engine built to 8½ to 1 compression pressure and operating on a "fuel of tomorrow." Technologists say fuels of this type are already available in more than one refinery and will be widely available in a relatively short time after many restrictive governmental controls are removed. Another new automotive engine, a commercial one now in production which turns out 150 hp. at maximum torque, was shown in operation, producing 250 hp. and using a special fuel which could be made now if demand were sufficient to warrant its production in quantity.

Still another development is the application of electronic equipment to the detection and measurement of "wild knock," or autoignition, a plague to the researcher and engine operator; this device may be used to produce a distinctive sound in a loudspeaker and is used also to operate a counter whereby the number of wild detonations may be counted exactly.

The laboratories include large repair and instrument-building shops; extensive fuel and other storage facilities; an intricate "switchboard" by which any available fuel in storage may be connected and fed to any engine in the entire system instantly; cafeteria and other facilities. A complete chemical laboratory may synthesize types of compounds desired as well as analyze any product desired.

Knowlton, Baumel Will Address Compact Meeting

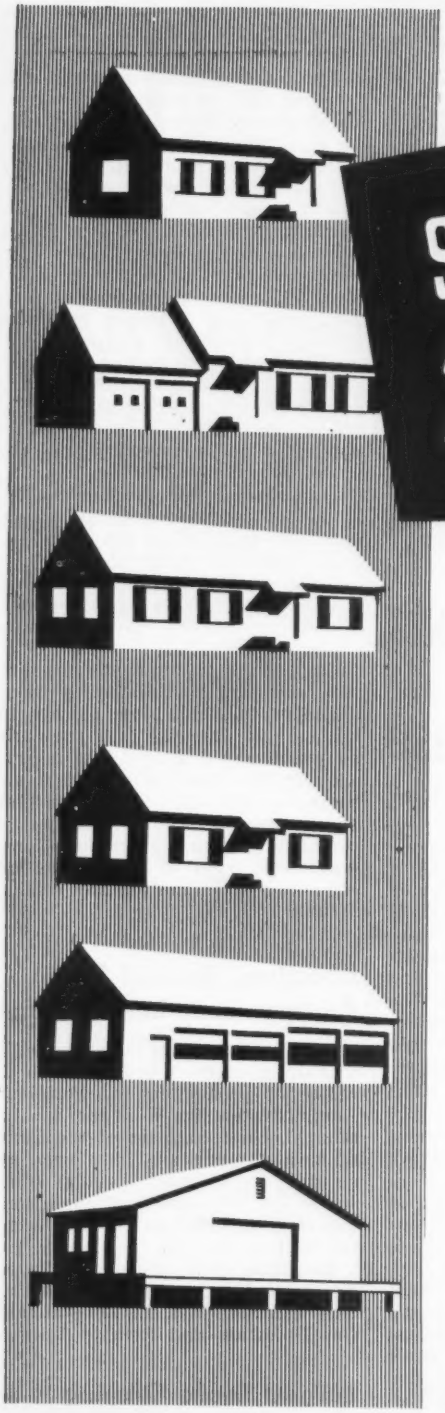
Don R. Knowlton, Oklahoma City consulting engineer and wartime director of production for Petroleum Administration for War, and Jack K. Baumel, chief engineer of the Texas Railroad Commission, have been announced as speakers for the Interstate Oil Compact Commission's quarterly meeting in Dallas December 9-11.

Knowlton will speak on "Proper Reservoir Control," and Baumel on "An Effective System of Statewide Gas Proration and Ratable Taking."

Largest Lease Offering Slated by Texas Board

Bids for mineral leases on 326,788 acres of state-controlled land, the largest offering ever made by the Texas School Land Board, will be opened in Austin December 3.

Of the total acreage, more than 90 per cent consists of submerged leases in rivers, bays, lakes, and the gulf. Only upland acreage is 2,400 acres in Harrison, Panola, Jones, San Patricio, Starr, and Orange counties.



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Sinclair Companies Grant Wage Increase of $31.20 Per Month

A $31.20 MONTHLY wage increase for employes of the Sinclair companies was agreed upon last week by H. F. Sinclair and O. A. Knight, president of the Oil Workers International Union, C.I.O., as the initial basis for a 1-year, cost-of-living wage adjustment.

The increase, effective October 1, amounted to an 18-cent hourly wage boost and was based upon the Bureau of Labor Statistics national cost-of-living index ended September 30.

In a joint statement both Sinclair and Knight described the new agreement, result of 2 weeks of discussion, as a possible pattern for the settlement of wage increase demands throughout the industry.

For the purpose of future adjustments fluctuations in the cost-of-living index are slated to be examined quarterly as soon as government figures are available. .

The agreement specifies that the wage scale in effect November 15, the date the agreement was signed, shall remain in force and that the formula adopted shall not operate to reduce wages below present levels.

The Oil Workers Union, active throughout the industry since its policy committee in Galveston in October decided on a move to seek a general 25-cent wage increase, was in the news in Houston, where Local 227 sought to begin negotiations with nine companies for a 25-cent hourly pay hike. Some 2,500 union members would be affected by the increase sought.

Companies affected include Sinclair Refining Co., Crown Central Petroleum Co., Sinclair Rubber, Inc., Crown Central Bulk Sales, Maritime Oil Co., Sinclair Bulk Sales, General American Terminal, Houston Pipe Line Co., and Sinclair Pipe Line Co.

Also from Houston came a report that the huge Freeport plant of the Dow Chemical Co. was closed by a strike of the International Union of Operating Engineers, A. F. of L.

In Borger, Tex., Phillips Petroleum Co. officials were negotiating with representatives of Local 351, A. F. of L. International Union of Operating Engineers, who, it was reported, went ahead with plans to call a strike vote.

In a five-county area of central Oklahoma early this week about 75 cable drillers and tool dressers were away from their jobs as a result of a wage dispute. The workers, members of the C. I. O. union, were seeking 25-cent hourly wage increases. They failed to report for work after sending a 30-day strike notice to drilling contractors in Seminole, Pottawatomie, Pontotoc, Hughes, and Lincoln counties. Two rigs were tied up and pickets were placed at several properties.

More Companies Announce Cost-of-Living Bonuses

A number of additional oil companies this week announced plans to provide employes with cost-of-living bonuses.

Standard Oil Co. (Ohio) revealed a 4-month wage adjustment program under which all employes except those covered by collective-bargaining agreements requiring negotiations will receive 10 per cent increases through February, providing their annual salary is below $7,200.

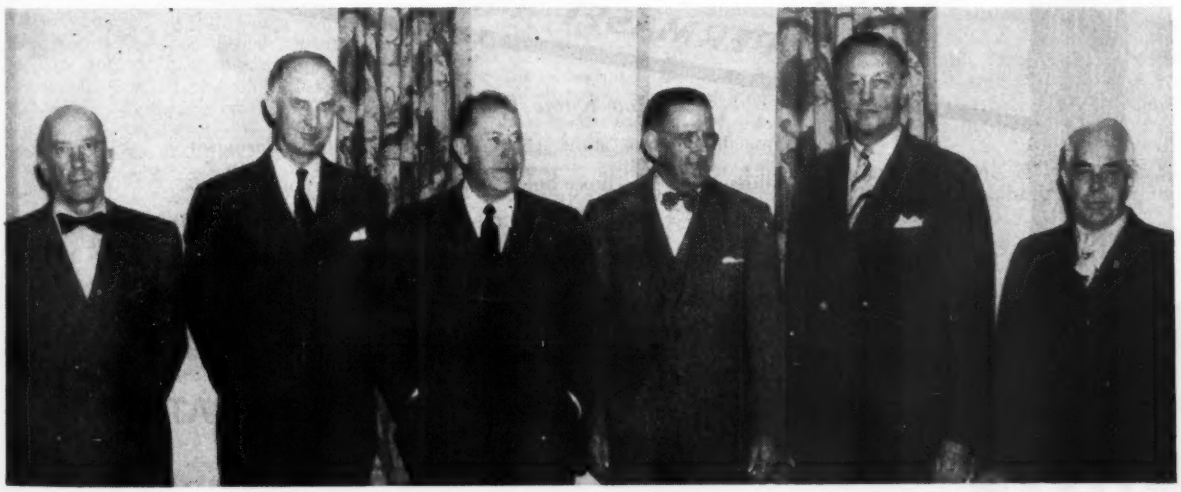
Bareco Oil Co. will pay employes $25 a month for November, December, and January, as will Kanotex Refining Co., Crude Oil Pipe Line Co., and Crude Transit Co.

Pan American Petroleum & Transport Co., Magnolia Petroleum Co., and Magnolia Pipe Line Co. announced a bonus of a week's salary for employes. Texas Pacific Coal & Oil Co. will give workers $75 in three monthly installments, and Mudge Oil Co. will provide a $100 Christmas bonus.

Skelly Oil Co. will give a $100 bonus to employes, $50 to be paid December 15 and $50 February 15. In announcing the bonus, W. G. Skelly, president, said he thought the current rise of living costs "will be of relatively short duration."

Trinidad Production Up

NEW YORK. — Crude-oil production of Trinidad Leaseholds, Ltd., (own fields only) showed a gain of 48,320 bbl. in September over August. September production was 543,436 bbl., or 18,115 bbl. daily, against 495,116 bbl., or 15,971 bbl. daily, in August.



The Arkansas-Louisiana division of the Mid-Continent Oil and Gas Association elected officers at its recent annual membership meeting in Shreveport. They include: Joe T. Goodman, Gulf Refining Co., and A. H. Wayland, Arkansas Natural Gas Co., division vice presidents; A. R. Carmody, North Central Texas Oil Co., Inc., division president; Sam S. Caldwell, former Shreveport mayor and new executive vice president and secretary-treasurer; A. J. J. Frommer, Ohio Oil Co., and A. H. Tarver, independent Shreveport operator, division vice presidents

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Heating-Oil Market Active; Crude Situation Watched

COLDER weather in the north and the threat of another walkout in the nation's soft-coal fields early this week was reflected in a more active burning-oil market. Prices held firm at existing levels, and one Mid-Continent refiner said demand was good for all grades.

Major topic of conversation in market circles, however, was the crude-oil price increase announced by Sun Oil Co. for Gulf Coast, East Texas, and Louisiana fields. Opinion seemed divided as to whether the advance will become general in the near future.

The unsettled crude situation was reported to have caused products suppliers to avoid future-delivery commitments at set prices. A general crude advance was considered as nearly certain to force an upturn in heating-oil prices, but there was doubt as to whether the gasoline market would rise during the slack winter consumption season.

In New York, No. 2 fuel oil and kerosene was reported firmer as a result of colder weather. Prices were unchanged. On the Pacific Coast, the market was expected to stiffen with settlement of the shipping strike imminent. Packaged and drum petroleum products have backed up during the prolonged dispute. On the Gulf Coast, Bunker C was reported tight, much No. 2 was said to be still going to storage.

Gasoline stocks rose more than 1,000,000 bbl. during the week ended November 9, while production gained more than 400,000 bbl. Daily demand was figured at 2,000,000 bbl., off 155,000 bbl. daily from the preceding week. Gas oil and distillate fuel-oil stocks again sharply increased during the week, rising from 65,943,000 bbl. to 67,286,000 bbl.

Danciger Oil & Refining Co.'s 7,000-bbl. daily capacity refinery at Pampa, Tex., was closed down last week with no indications as to reopening. The Danciger plant has been supplying the local West Texas market and shipping some material north.

Encouraging news for the marketing end of the industry came from Chicago where the oil division, Institute of Cooking and Heating Appliance Manufacturers, forecast heating requirements in new homes contemplated under the veterans' housing program will add nearly 8,000,000 bbl. annually to the nation's domestic fuel-oil consumption. The division said if only 500,000 of the 2,700,000 new homes planned, use vaporizing oil-burning equipment, the fuel oil needed will total 7,750,000 bbl. at an average of 650 gal. per home per year. Meanwhile, in Washington the Census Bureau announced factory shipment of oil burners totaled 55,887 during August, a 28 per cent increase over July shipments.

Amendment Proposed to Elk Hills Contract

WASHINGTON. — A compromise amendment to the Elk Hills unit operating contract with Standard Oil Co. of California was proposed by Secretary of the Navy James W. Forrestal at hearings before the House Naval Affairs Committee Monday. As a result the committee recessed until such time as the Navy and Standard may agree on detailed terms, after which the committee will decide whether to give or withhold approval of the contract change as required in the original law.

At present Standard has to pay about $600,000 per year as the so-called readiness program of maintaining wells and engineering studies in the Naval Petroleum Reserve. At the end of the primary period in about 3 years, Navy will pay 64 per cent of this cost and Standard 36 per cent and on final depletion of the reserve Standard will get back without interest one-third of its costs during the primary period. Standard asked the Navy to start paying its 64 per cent immediately, threatening otherwise to terminate the primary period thereby also involving production of a greater amount of the Navy's share of the reserve.

At a hearing on this September 9 the House committee seriously questioned the wisdom and legality of this contract change, so Forrestal asked a postponement while he consulted experts. Monday he reported that E. De Golyer and A. Jacobsen had independently reported that the amendment was a good business deal and would undoubtedly be made if the contract were between two private companies.

However, Forrestal said giving up the right to terminate the primary period was not sufficient consideration by Standard to make legal a contract change by which he figured Standard would gain $48,000 per year for the life of the field as interest on its $400,000 per year cost for 3 years. He proposed instead that the Navy pay 32 per cent of the readiness cost during the primary period and that in return Standard agree not to terminate the primary period earlier than scheduled.

High Court Holds Invalid Fluid-Level Device Patent

WASHINGTON.—The Supreme Court held invalid a patent owned by Cranford P. Walker and Depthograph Co. covering instruments for measuring the distance to the level of oil in a well by the sound-echo-time method.

Walker sued Halliburton Oil Well Cementing Co. for infringement and won in the lower courts. The Walker patent used a mechanical accoustical resonator as a sound filter to amplify echoes from pipe joints and tubing catchers in a well, while Halliburton used an electronic filter and amplifier. The court held that the Walker patent merely covered application of known principles to a particular problem and its claims were written so broadly as to cover all possible mechanical or electrical means of echo-sounding oil wells. The court said the Walker claims are not sufficiently definite to constitute a valid invention and patent.

DEATHS

Matthew Collins, drilling superintendent of Trinidad Petroleum Development Co. of Trinidad, B.W.I., who arrived in Petrolia, Ont., on furlough last August, died recently at London, Ont. A native of Petrolia, he drilled in the Canadian West and Mexico but spent the greater part of his life in Trinidad.

Clyde Arnold Stroupe, 53, with United Natural Gas Co. the past 28 years, died November 12 at his home in Hampton Station, Pa.

Preston J. Lea, 70, North Texas operator, died at his home in Wichita Falls November 11.

Zina L. Bliss, 66, claim agent for Gulf Refining Co., died in Fort Worth November 12. He had been with the company since 1924.

M. F. Knight, 72, who took part in the early development of Weber pool in Northeast Oklahoma, died November 13 in Vinita, Okla.

Arnold Schlaet, 87, one of the founders of The Texas Co., died November 14 in a St. Petersburg, Fla., hospital. His home was in Westport, Conn.

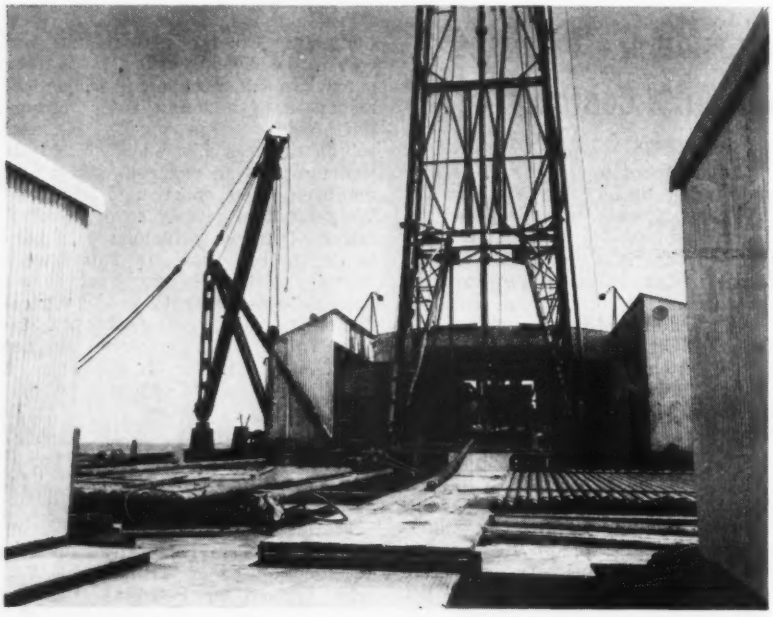
DRILLING BARGE DESIGNED FO

SALT DOME OIL CORP.'s new drilling barge recently placed in operation has a number of unusual features which make it one of the most outstanding barges to be found in Gulf Coast waters.

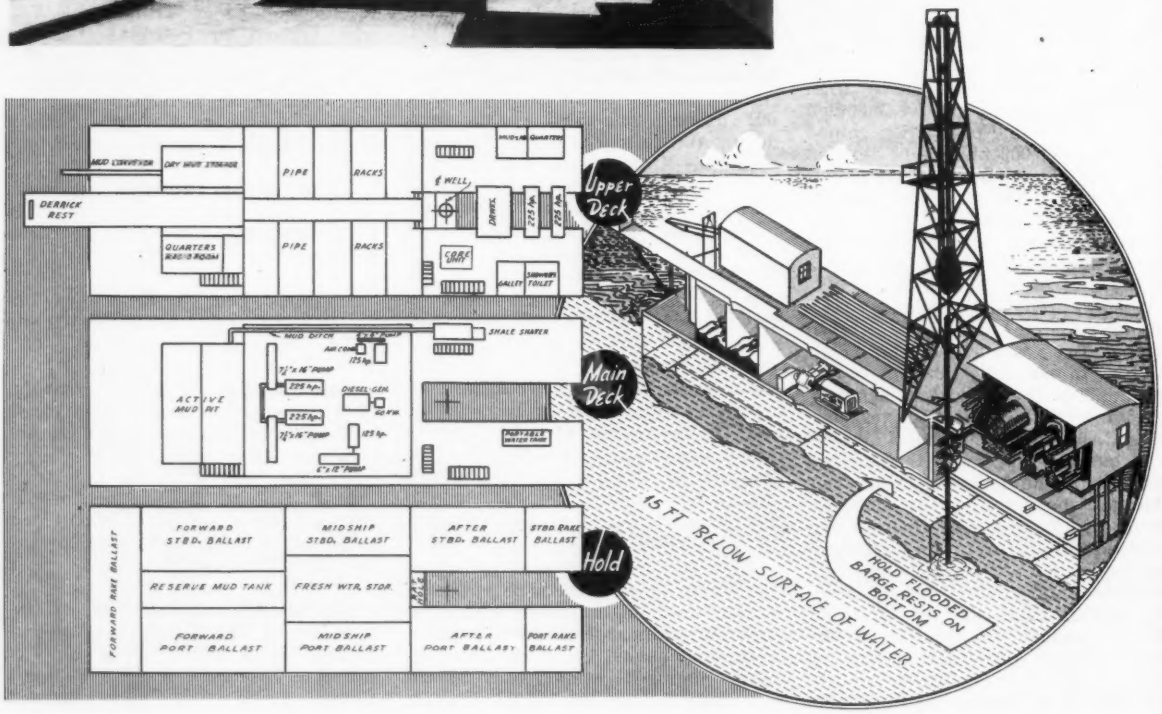
Specifically designed by Salt Dome engineers for operation in Matagorda Bay, it is now on location approximately 10 miles south of Palacios, Tex. At this point the barge is resting on bottom in 14 ft. of water. This is believed to be the deepest barge operation (without shell matting) ever made in Coastal operation.

The barge is 140 ft. long, 50 ft. wide, and 16 ft. deep. This depth gives about 2.5 ft. average freeboard anywhere in the bay. Fig. 1 shows the arrangement of drilling equipment, pipe racks, dry-mud storage house, and crew accommodations on the upper deck. On this barge the major items of drilling equipment consist of a Lee C. Moore 126-ft. jack-knife derrick and Unit Rig U-15 draw works powered by two 225-hp. gas-gasoline engines. This rig is capable of drilling to a depth of 8,500 ft. with 4½-in. drill pipe.

It will be noted that the upper deck is so designed as to permit the derrick to be laid down the length of the barge in case of emergency, such as a hurricane, or when necessary in moving from one location to another.



The drawing below shows a diagram of the upper deck, main deck, and hold of Salt Dome Corp.'s new drilling barge especially designed for operation in Matagorda Bay. The barge is resting on bottom in 14 ft. of water approximately 10 miles south of Palacios, Tex. The view at left shows front view of drilling rig, with base of the jack-knife drilling mast, and pipe rack. The stiff-legged derrick crane at left is operated by truck winch powered by a 5-hp. electric motor



FOR 15-ft. WATER OPERATION

by E. H. Short, Jr.

Also on the upper deck are four structures which house crew quarters and mud lab, galley and crew's showers, mud storage and mud conveyor, and staff office and quarters.

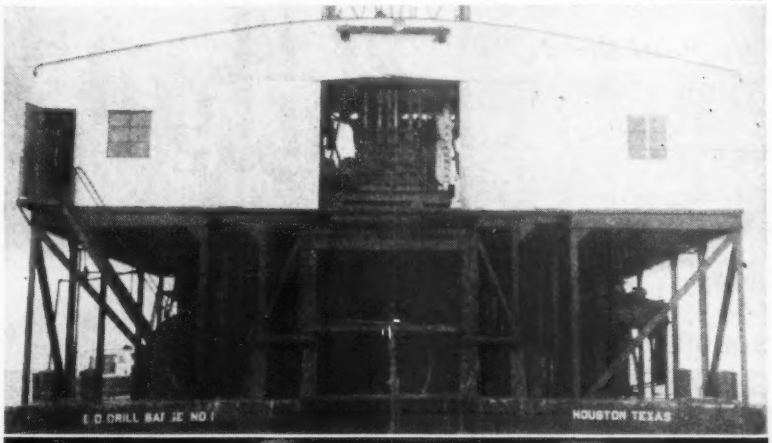
A 75-watt transmitter-receiver is located in the staff quarters house located opposite the dry-mud-storage house. The Houston office of Salt Dome Oil Corp. is therefore in constant touch with barge operations. The Salt Dome fleet which operates from Palacios to the location is also radio equipped.

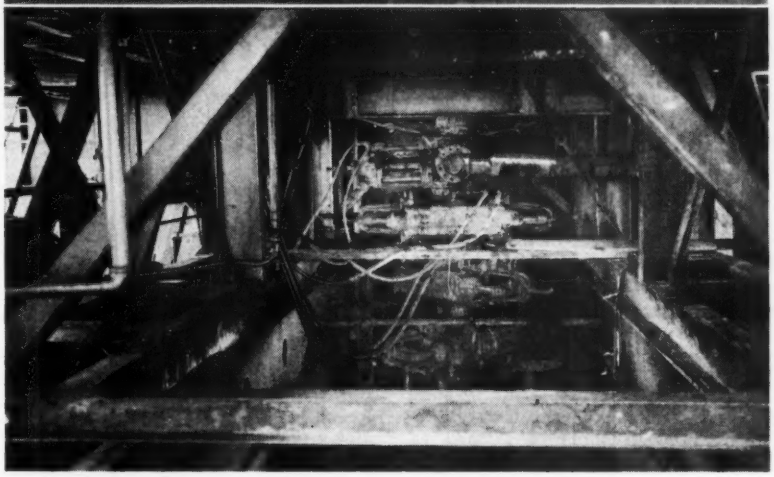
The Main Deck

On the main deck (Fig. 2) below the rig floor is located the engine room. This room houses two 7¼ by 16-in. mud pumps, two 225-hp. engines, one 60-kw., 115-volt d.c. generator with diesel drive, one 6 by 12-in. mud pump, one 125 hp. engine, one 4 by 4-in. water pump for floor pressure system, one air compressor, and one 40 hp. engine.

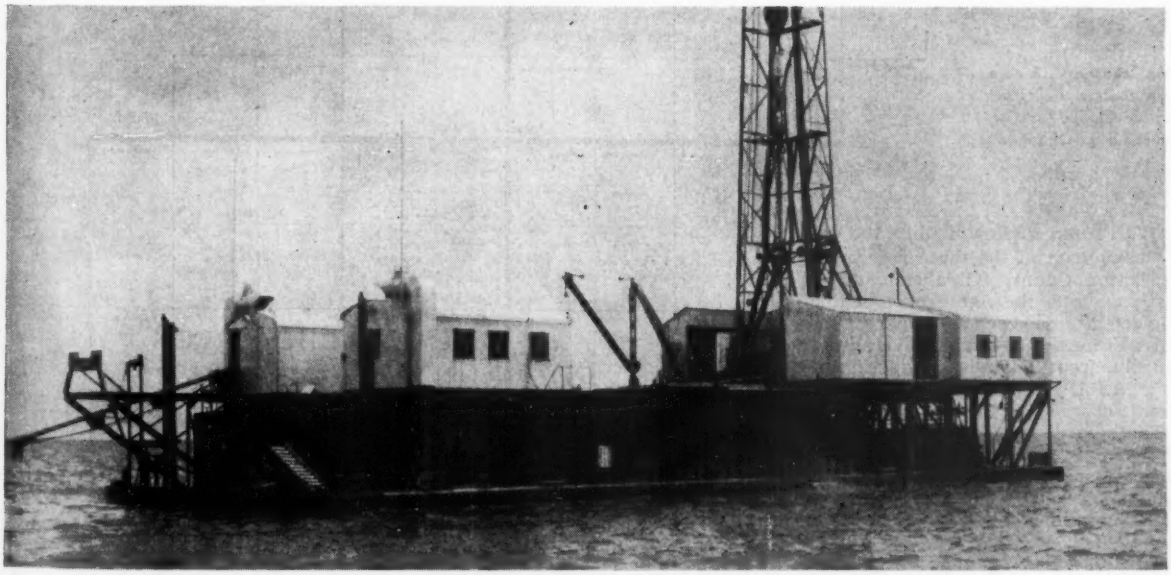
Because of the fact that Matagorda Bay is particularly noted for its squalls and hurricanes it was essen-

(Continued on page 77)



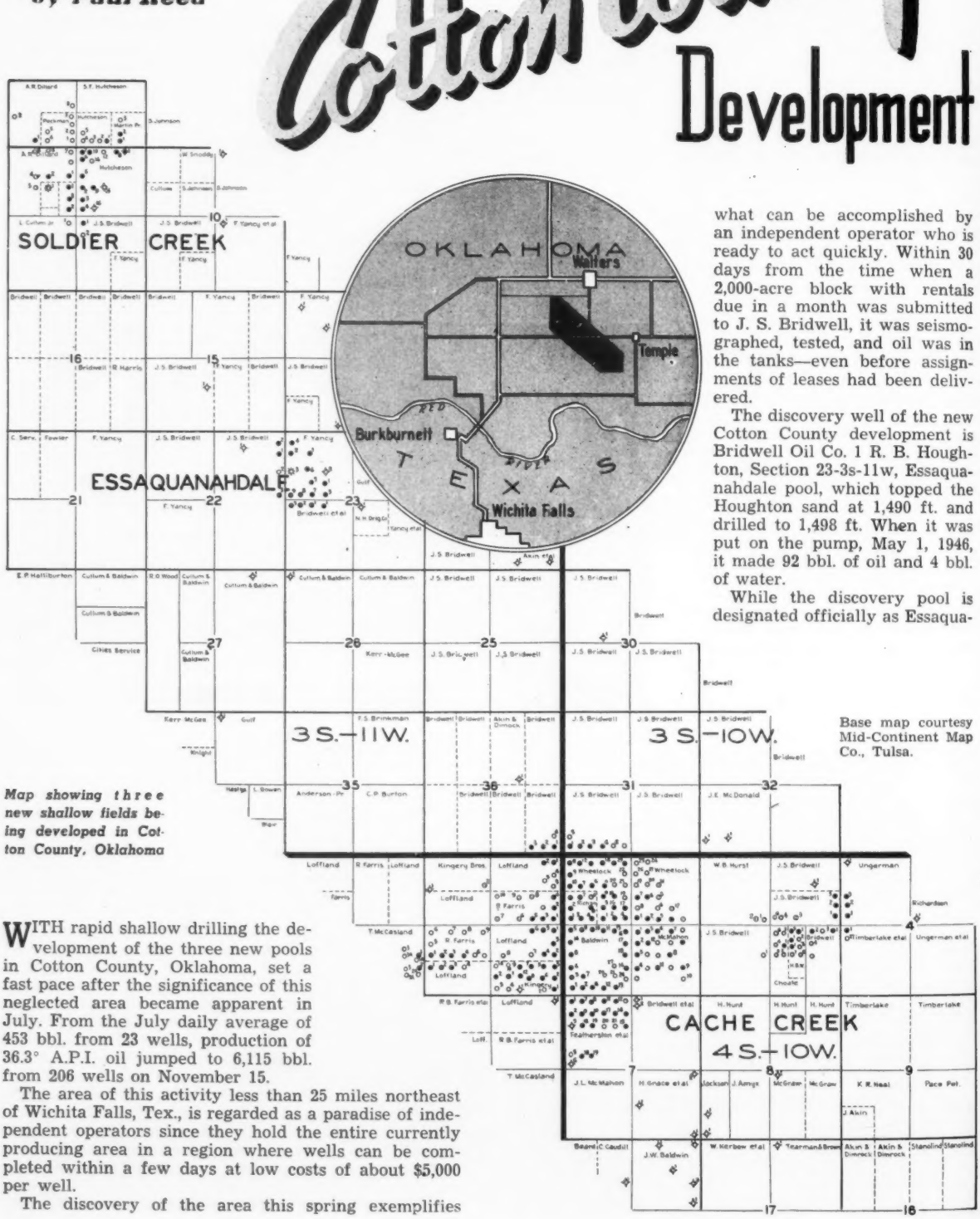


Top: Stern end of barge showing drawworks engines on upper deck and slot in main deck. Right: Slot and blowout-preventer arrangement. Below: Closeup of barge showing arrangement of housing and equipment on upper deck of barge



Fast Pace Being Set in Cotton County Development

by ***Paul Reed***



Map showing three new shallow fields being developed in Cotton County, Oklahoma

Base map courtesy Mid-Continent Map Co., Tulsa.

WITH rapid shallow drilling the development of the three new pools in Cotton County, Oklahoma, set a fast pace after the significance of this neglected area became apparent in July. From the July daily average of 453 bbl. from 23 wells, production of 36.3° A.P.I. oil jumped to 6,115 bbl. from 206 wells on November 15.

The area of this activity less than 25 miles northeast of Wichita Falls, Tex., is regarded as a paradise of independent operators since they hold the entire currently producing area in a region where wells can be completed within a few days at low costs of about $5,000 per well.

The discovery of the area this spring exemplifies what can be accomplished by an independent operator who is ready to act quickly. Within 30 days from the time when a 2,000-acre block with rentals due in a month was submitted to J. S. Bridwell, it was seismographed, tested, and oil was in the tanks—even before assignments of leases had been delivered.

The discovery well of the new Cotton County development is Bridwell Oil Co. 1 R. B. Houghton, Section 23-3s-11w, Essaquanahdale pool, which topped the Houghton sand at 1,490 ft. and drilled to 1,498 ft. When it was put on the pump, May 1, 1946, it made 92 bbl. of oil and 4 bbl. of water.

While the discovery pool is designated officially as Essaqua-

nahdale, it is generally referred to in Wichita Falls as the Bridwell pool. Now it is less active than the Cache Creek pool 3 miles southeast, and Soldier Creek pool, locally called the Johnson pool, 2 miles northwest. It is expected that the active area now called East Cache Creek will be joined to the Cache Creek pool with a saddle between. Current drilling activity is concentrated on the northwest end of Soldier Creek and the east end of East Cache Creek. Altogether there are 34 wells drilling in Cotton County.

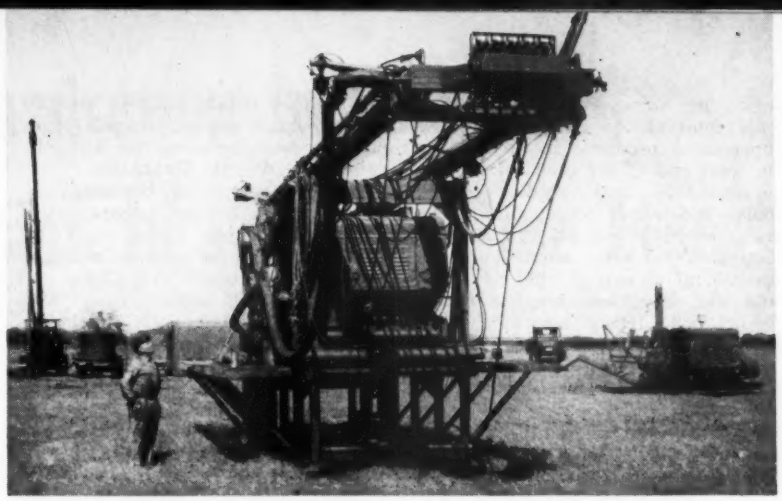
Houghton sand depths and thicknesses for the three pools are indicated as follows: Cache Creek, 1,300-1,330 ft.; Essaquanahdale, 1,490-1,505 ft.; Soldier Creek, 1,585-1,630 ft. Entire sand thickness has not yet been determined because operators are completing wells without drilling all of the sand. In the Cache Creek pool the sand is generally regarded as being thicker than in the other two pools. Soldier Creek appears to have a larger structure and gas cap than Essaquanahdale; at both of these pools wells flow in the early stages and some high gas-oil ratios must be dealt with. There is little gas at Cache Creek.

Wells have been brought in with flush production of 50-200 bbl. per well at Cache Creek; 25-100 bbl., Essaquanahdale; and 50-500 bbl., Soldier Creek.

The new pools have been classified as allocated fields: Cache Creek and Essaquanahdale, October 1, and Soldier Creek early in November.

A well is usually drilled and completed in 3 days. This rate has been exceeded in some cases. A common practice in the area is to drill two wells a week and shut down on Sunday. One operator following such a 3-day-per-well program starts at 8 a.m. of the first day. He moves in light rotary equipment and rigs up. He spuds with a 9-in. hole and reams the first 100 ft. to 13¾ in. Between midnight and 2 a.m. he sets 100 ft. of 10-in. surface casing and cements with 50 sacks. Drilling is resumed between 6 and 8 a.m. of the second morning and sand is found between 5 and 9 a.m. of the third day. With only one 9-in. or 8¾-in. long-toothed bit the well is drilled to the sand. To facilitate running the casing 10 to 20 sacks of Aquagel are used.

After penetrating the top of the pay sand, 7-in. casing is cemented with 40-50 sacks; 5-in. is often used where 7-in. is not available. A spudder is moved in to drill out the plug and penetrate the sand 4 to 8 ft. Very little coring has been done; because the sand is soft and coarse, coring is difficult. In the few cases reported where coring has been done, cores were examined by Cable & Stine.



Light rotary equipment moved away from Cache Creek pool well which is being drilled into the Houghton sand by a spudder

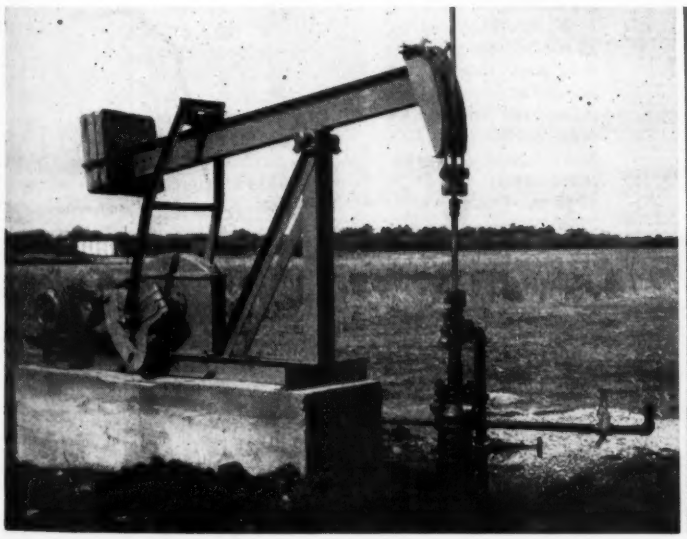
Cost of drilling is reported in the $1.75-$2.00-per-ft. range.

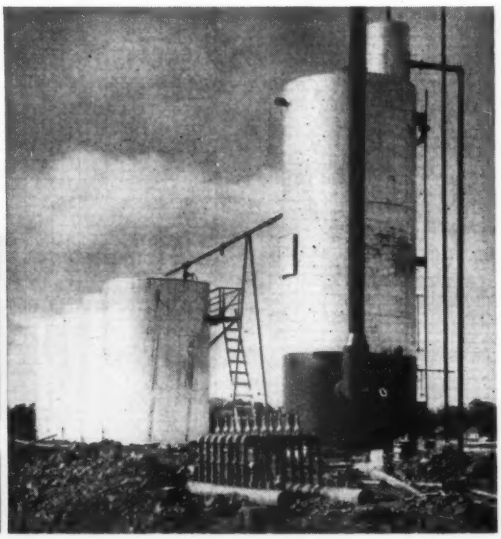
The general practice is to pump wells electrically by individual units powered by 7½-hp. motors. There are some gasoline-engine-driven units installed prior to obtaining electric facilities. The only central power in the area serves Bridwell properties at Essaquanahdale.

Production of the area has been taken by Stanolind Pipe Line Co. Existing facilities to a nearby trunk line are sufficient for handling nearly double the present production of the three new pools.

The new Cotton County development lies along the crest of a buried high extending northwest and southeast. The producing part of the sand appears to be continuous on each of the higher points with some shale breaks. On the west side of the Cache Creek pool and throughout the areas of the Essaquanahdale and Soldier Creek pools there are two sands sep-

Production equipment in Cache Creek pool: (Left) Typical installation of pumping jack operated by individual electric motor. (Right) Tank battery, treater, and manifold





arated by an approximately 100-ft. shale interval. At Cache Creek the upper sand produces in an area at the west end of the pool. In the Essaquanahdale and Soldier Creek pools, the upper sand contains a small amount of gas. Most of the production of the area comes from the lower sand known as the Houghton sand. The lower sand consists of two distinct sand lenses separated by a shale break varying 6 in. to 7 ft.

Both sands belong to the Pontotoc (Cisco) series of Pennsylvanian age. The upper sand is approximately 200 ft. below the base of the Permian and approximately 400 ft. above the Megargel lime, a common marker in North Texas, which lies between the Breckenridge and Gunsight limes.

The Houghton sand was deposited earlier than the sands of the Walters field, to the north, and also earlier than the sands of Archer and Wichita counties, Texas, to the south. But the Houghton sand is equivalent to a 1,400-ft. pay sand near Electra, Tex. The Houghton sand now developed is missed on the south and west side of the high and is regarded as extending north and east.

The Arbuckle high is reflected in the upper beds. And it appears that the high on which this new production occurs is one of several ridges, possibly four, between the Red River and the Wichita Mountains.

Proven acreage at the end of October was estimated approximately as follows: Cache Creek and East Cache Creek, 1,100 acres; Essaquanahdale, 100 acres; Soldier Creek, 400 acres; total 1,700 acres.

While it is too early to obtain reserve estimates for the whole proven area of 1,700 acres, still certain rough calculations may be made from available data. Reserves are regarded as 350 bbl. per acre-foot with normal recovery. These may be increased to double if pressure maintenance methods are applied soon.

Wells are drilled with 440-acre spacing—nine wells per 40 acres. Bottom-hole pressures are from 400 to 450 psi. Core analyses show porosities of 20-25 per cent at an edge well in Cache Creek and 28-29 per cent at Essaquanahdale; permeabilities of 700 md. at Essaquanahdale and 200 md. at Cache Creek; connate water, 25 per cent.

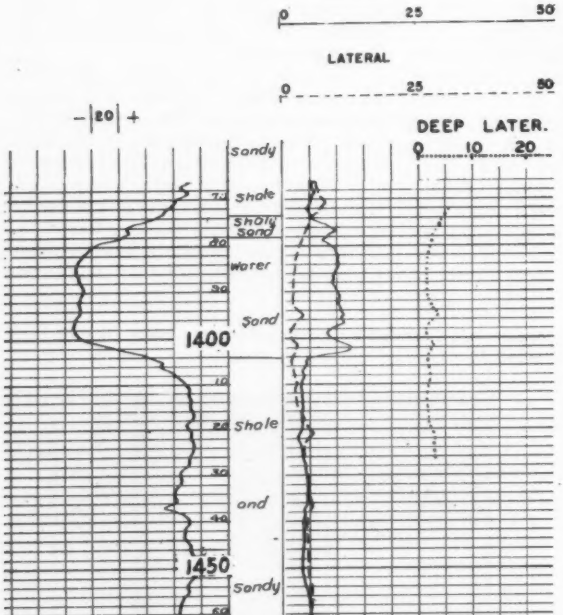
Production from the Walters field, 6 miles northeast of the Soldier Creek pool, opened in 1917 with a 2,176-ft. well producing mostly from the Priddy sand. The entire field reached a peak of 3,400 bbl. daily in September 1919. Wells had initial production of 100 to 225 bbl.

Between the development of the old Walters pool opened in 1917, to the Bridwell discovery this year, there have been no commercial oil fields in Cotton County. Although Cotton County appears to have been neglected, several hundred wildcat wells were drilled there prior to the Bridwell discovery. A group of nine dry holes was drilled within a square mile, a half mile southeast of the Cache Creek pool. These were the result of exploration dating from the late 1920's initiated by R. J. Riggs in a program of Indian Territory Illuminating Oil Co. Two tests 3 and 5 miles southeast of the current play drilled by Amerada Petroleum Corp. in the early 1930's identified the axis.

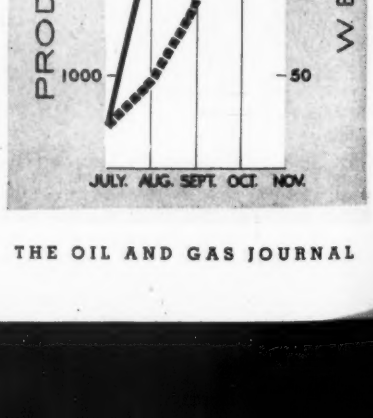
Several wells have been drilled to the Arbuckle, including five wells of Bridwell. The log of this company's 2 R. B. Houghton, Section 23-3s-11w, shows: Permian-Pennsylvanian contact 1,180 ft.; upper gas sand, 1,378-1,400 ft.; Houghton sand 1,470-1,515 ft.; Megargel lime 1,890-1,905 ft.; Canyon lime 2,582 ft.; Arbuckle (Ellenburger) lime 2,768 ft.

LATE FIELD REPORT.—Martin Properties, Inc., 1 Dyer, SW SW SW 33-2s-11w, 1 mile north of Soldier Creek production, topped a new sand at 1,650 ft., flowed 500 bbl. overnight. This new sand, apparently below the Houghton sand, flowed 200 bbl. at A. R. Dillard 2 Enright, NW NW SW 4-3s-11w, topped, 1,651 ft.

Daily production: Cache Creek 4,134 bbl., 152 wells; Essaquanahdale 273 bbl., 17 wells; Soldier Creek 1,708 bbl., 37 wells.



Left: Section of electric log of Bridwell Oil Co. 1 R. B. Houghton, Section 23-3s-11w, Essaquanahdale pool, showing upper gas sand, 1,378-1,400 ft., and the Houghton oil sand, 1,478-1,512 ft. This well topped Arbuckle (Ellenburger) lime at 2,768 ft. Total depth, 2,848 ft.



Right: Chart indicating rapid increase in oil production and completed oil wells since July in the Cache Creek, Essaquanahdale, and Soldier Creek pools

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Use of Dehydration in Combating Internal Corrosion in Products Pipe Lines

by Harry K. Phipps*

IT is now generally accepted that interior corrosion in product pipe lines is due principally to the presence of water in the gasoline or oil being transported. If the quantity of this water is above the saturation point for a given temperature, it will separate from the oil, and in combination with the free oxygen in solution in the product, cause rusting of the interior pipe surface. Water in itself has little effect on the corrosion of a line, provided it is completely dissolved in the product being handled. However, if the water content exceeds the product's saturation point at the temperature encountered in the line, free water will collect on the interior surface of the pipe. This fact accounts for the corrosion which took place during the early years of product-pipe-line operation.

A typical gasoline at a temperature of 100° F. will carry in solution about 160 p.p.m. of water; however, this same gasoline at 60° F. will only carry about 75 p.p.m. It therefore follows that when gasoline, which is water saturated at 100° F., is pumped through a line where the normal ground temperature is 60° F., about 85 p.p.m. of water will be deposited on the interior pipe surface. It is this deposited water that brings about the corrosion and pitting which has been so detrimental to the maintenance of capacities and continuity of operation.

Fig. 1 indicates the determined water solubility for various products at temperatures ranging from 10° to 130° F. The primary function of dehydration is to lower the moisture content of the product being pumped to a point where the small amount of the moisture remaining will stay in solution in the liquid and not drop out as minimum line temperatures are encountered.

Scrapers

It is often the practice in products pipe-line operations to run scrapers even if inhibitors are used—which practice is definitely not necessary with dehydration. This fact should be borne in mind in comparing the relative costs of these two methods of corrosion prevention, inasmuch as the periodic running of scrapers constitutes a definite charge against operations. Furthermore, there is always the attendant hazard that the scrapers will lodge in the line—which accident may prove quite costly from the standpoint of operating delays and property or land damage. This last item assumes particular importance if it becomes necessary to remove these scrapers in urban or highly congested areas.

Dehydration Process

A typical dehydration system is the one now in use on the products pipe line operated by the White Eagle division of our company and located at the Augusta, Kans., pump station. The first unit of this system was constructed in the fall of 1936 in connection with 176 miles of 6-in. line extending from Augusta, Kans., via Topeka to Kansas City, with terminal facilities at the two latter points. Installation of this process followed extensive research by our technical laboratories, as a result of which an absorption method of dehydration was selected as being, in their opinion, the most practical and effective means of combating internal corrosion on the pipe line. Certain phases of this dehydration process are now covered by Socony-Vacuum patents.

The original installation consisted of four drums, approximately 4 ft. in diameter and 9 ft. high, equipped with cone bottoms. In 1941, two more drums of the same size were added to take care of an additional volume of oil brought about by the construction of 335 miles of new line extending from Topeka, via Omaha and Sioux City, to Sioux Falls, S. D. The absorption medium employed in this first installation, and still in use, is 4-8 mesh activated alumina—3,000 lb.

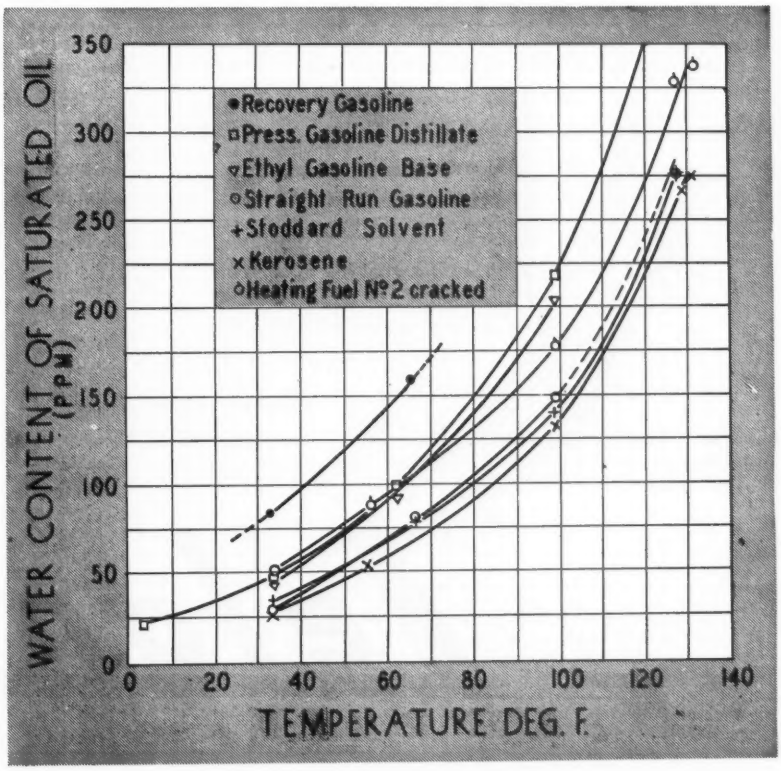
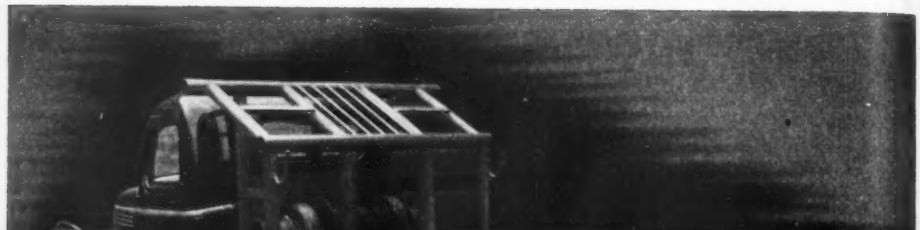


Fig. 1

*Socony-Vacuum Oil Co., Inc., White Eagle Division, Wichita. A paper presented at the annual meeting of the American Petroleum Institute, Chicago, November 11, 1946.

Leland



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Leland's oil field truck body is equipped with tail roller fabricated from hydraulic tube, rolling on ball bearings supported by heavy steel castings, steel fabricated frame; 2″, center match, hard wood deck; headache rack of heavy duty tubing; and gin poles of heavy duty drill pipe.

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of which is used in each drum. The alumina bed is supported on a heavy metal-perforated plate covered with a stainless steel screen of 40-60 mesh. Fig. 2 shows a flow diagram of a dehydration system such as the one described.

The dehydration operation is accomplished by pumping the product through three of the towers operating in parallel. On the original installation, the piping was so arranged as to provide for a downward flow through the alumina bed. However, due to a tendency for the retaining screen to plug up, the manifolding was later changed so as to permit either an upward or downward flow. At the present time, the flow is principally up although, as already indicated, the direction can be changed if the conditions warrant. It should also be mentioned that the piping is constructed in such a manner as to minimize contamination—that is to say, whenever a change in product is being made, the dehydrator drums are momentarily bypassed so as to sweep all of the previous product out of the lower header before the one to follow is started through the system. . . .

With three drums operating in parallel, the reactivation stage has been staggered so as always to have a fresh tower on stream with one that is in the middle, and another that is approaching the end of its operating cycle. This staggering, which is based on a schedule calling for the regeneration of one tower every 12 hours, makes for a more uniform degree of dehydration. The present pumping rate through the dehydrating system is 700 bbl. per hour, divided equally among the three towers on stream. In general, about 60 per cent of the total water will be removed from the product in passage through the tower, provided the water that has been picked up by the alumina does not exceed 12 per cent by weight in the bed. Alumina will dry oils to less than 10 p.p.m. if the water content of the alumina bed itself does not exceed 9 per cent, and will be in equilibrium with 100 p.p.m. of water in gasoline and 15 per cent water in the alumina bed. The 700 bbl.-per-hour rate through the 4-ft. towers is equivalent to 0.31 bbl. per sq. ft. per minute, or 150 bbl. per ton per hour, for the 4½ tons of alumina in the drums. Throughput rates greater than 700 bbl. have not proved practical due to a considerable loss in dehydration efficiency, and for this reason it is felt that for the size drums in question, this rate is about the maximum practical one.

After a given dehydrator drum has been in service for 12 hours, or whenever a change from low to high flash product, or vice versa, is being made, a new drum, or drums as the case may be, is placed in service and the alumina bed regenerated as follows: The oil flow is stopped, the drum drained, and superheated steam (450° F. at 1 atmosphere) is passed through the alumina until the entire bed has been raised to a temperature of 380° F., which usually requires about 3½ hours. With the completion of this operation, the bed is blown with refinery gas in order to sweep out the remaining steam, after which the gas itself is cut off and a vacuum of 26 in. of mercury is applied to the tower for about 1 hour. The vacuum jet is then closed and the drums filled with natural gas, thereby completing the regenerating cycle. In earlier installations, superheated air was used in place of natural gas. However, this practice was quickly discontinued when it was found that the complete elimination of all air from the alumina bed is necessary in order to prevent the destruction of gum inhibitors in the gasolines and other oils. The system of regeneration just described, however, will permit the alumina to dehydrate inhibited gasoline without the loss of inhibitors. It should also be mentioned that the alumina does not absorb a sufficient quantity of the dyes used in Socony-Vacuum gasoline to make any color change in the dehydrated product. However, it is inadvisable to follow a dyed product with a water-white oil without first regenerating the alumina bed.

At present, 12 different products are being handled through the dehydration system—these products consisting of 6 gasolines and a like number of burning oils. As already indicated, an average reduction of 60 per cent is normally effected in the moisture content. However, during periods of extremely cold weather or when ground temperatures are above those of the atmosphere, it is not necessary to make as much reduction in water content as is the case during warm weather. On the other hand, when the ground temperature

(Continued on page 101)

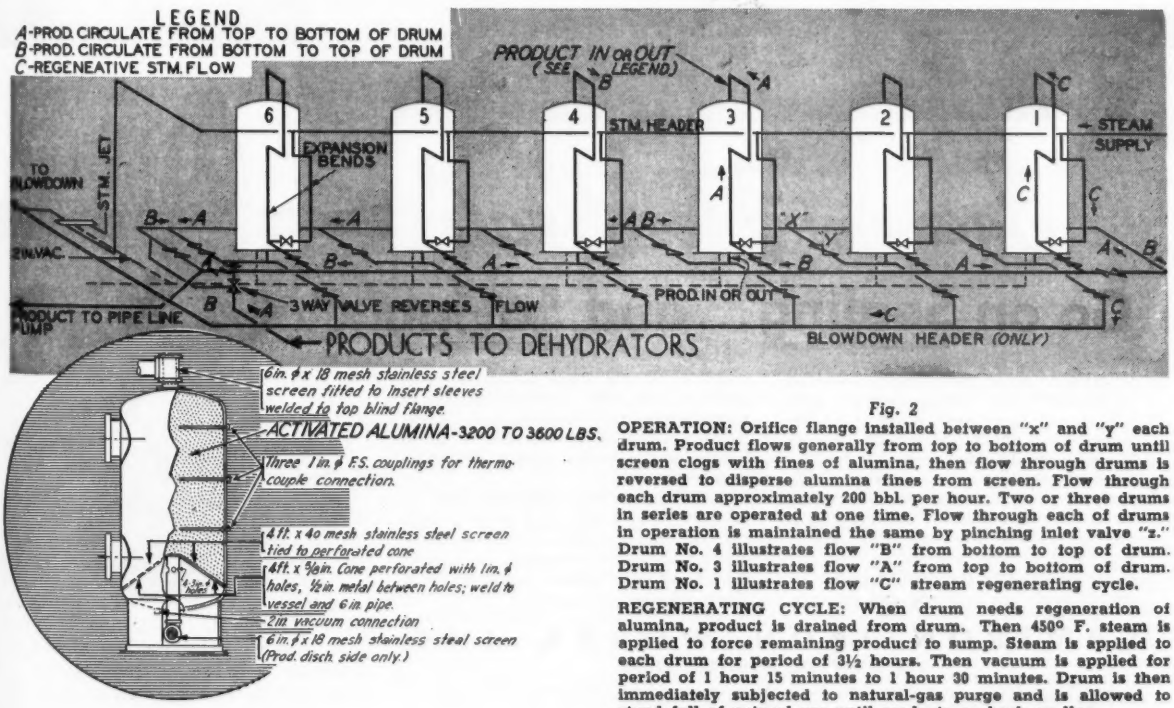
LEGEND
A-PROD. CIRCULATE FROM TOP TO BOTTOM OF DRUM
B-PROD. CIRCULATE FROM BOTTOM TO TOP OF DRUM
C-REGENEATIVE STM. FLOW
PRODUCT IN OR OUT (SEE LEGEND)
STM. HEADER
STEAM SUPPLY
EXPANSION BENDS
STM. JET
TO BLOWDOWN
2 IN. VAC.
3 WAY VALVE REVERSES FLOW
PROD. IN OR OUT
PRODUCT TO PIPE LINE PUMP
PRODUCTS TO DEHYDRATORS
BLOWDOWN HEADER (ONLY)
6in. ϕ x 18 mesh stainless steel screen fitted to insert sleeves welded to top blind flange.
ACTIVATED ALUMINA-3200 TO 3600 LBS.
Three 1 in. ϕ F.S. couplings for thermo-couple connection.
4 ft. x 40 mesh stainless steel screen tied to perforated cone
4ft. x 3/16in. Cone perforated with 1in. ϕ holes, 1½ in. metal between holes; weld to vessel and 6 in. pipe.
2 in. vacuum connection
6 in. ϕ x 18 mesh stainless steal screen (Prod. disch. side only.)

Fig. 2

OPERATION: Orifice flange installed between "x" and "y" each drum. Product flows generally from top to bottom of drum until screen clogs with fines of alumina, then flow through drums is reversed to disperse alumina fines from screen. Flow through each drum approximately 200 bbl. per hour. Two or three drums in series are operated at one time. Flow through each of drums in operation is maintained the same by pinching inlet valve "z." Drum No. 4 illustrates flow "B" from bottom to top of drum. Drum No. 3 illustrates flow "A" from top to bottom of drum. Drum No. 1 illustrates flow "C" stream regenerating cycle.

REGENERATING CYCLE: When drum needs regeneration of alumina, product is drained from drum. Then 450° F. steam is applied to force remaining product to sump. Steam is applied to each drum for period of 3½ hours. Then vacuum is applied for period of 1 hour 15 minutes to 1 hour 30 minutes. Drum is then immediately subjected to natural-gas purge and is allowed to stand full of natural gas until ready to go back on line.

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A Cameron "Flex-Seal" in closed position. Note how the gate seats in the resilient flow-way insert (red).

CAMERON "FLEX-SEAL" VALVES · CAMERON "FLEX-SEAL" VALV

Expansion and Free-Gas Saturation

*by Park J. Jones**

OIL PRODUCTION by water

PART 4 OF A SERIES

A DECLINE in reservoir presure down to saturation pressure is accompanied by expansion of reservoir liquid and frequently by some encroachment of water. The oil recoverable by expansion of reservoir liquid varies with compressibility, pressure decline, and volume of oil in place. The rate of water encroachment at a given time is proportional to pressure decline. At pressure less than saturation values, some oil is produced by free gas. The possible gain in recoverable oil by water at declined pressures is nominal even if a free-gas saturation as high as 10 per cent of porosity is not displaced by water. The corresponding pressure decline is 15-25 per cent of saturation pressure.

Rate of Water Encroachment

FUTURE rates of water encroachment into reservoirs are not known at the time of discovery or during the period of development. Consequently, a development program for producing oil by water should provide an ample allowance for injection wells. Some reservoirs may require a higher investment for water-injection facilities than is required for oil-producing wells. As a rule, development programs for producing oil by water should be formulated on the assumption that encroaching water will have to be supplemented by injected water.

Two or three years of production history may be required for the purpose of ascertaining the rate of water encroachment. Field experience indicates that the probable future rate of encroachment is likely to fall within the limits defined by:

$$C\,\frac{\log t_o}{\log t} \geqq \frac{Q}{\Delta P} \geqq C\left(\frac{t_o}{t}\right)^{1/2} \quad (1)$$

where t_o is the number of days during which the rate of water encroachment averaged C barrels per day per pound pressure decline; t is time in days; and $Q/\Delta P$ is the probable future rate of water encroachment in barrels per day per pound pressure difference between the initial and operating reservoir pressures.

The curves in Fig. 4-1 are illustrative solutions of Equation 1. The upper curves are for a reservoir in which the estimated rate of water encroachment averaged 30 bbl. per day per pound decline in reservoir pressure during the first 1,000 days. The future rate of water encroachment is not likely to exceed the rate defined by curve A nor be less than the rate defined by curve B. Curves C and D are for a reservoir in which the estimated rate of water encroachment averaged 10 bbl. per day per pound pressure decline during the first 1,000 days. The future rate is likely to fall within the limits defined by curves C and D.

Equation 1 does not apply if the source of water is limited structurally as by faults or stratigraphically as by changes in lithology or permeability. Large reservoirs require a longer test period t_o than small reservoirs. Estimates of the rate of water encroachment C are based on periodic pressure surveys during the time interval t_o. The estimates are also based on cumulative volumetric withdrawal and cumulative expansion of reservoir fluids.[1]

The total rate of water encroachment is equal to the unit rate Q times the decline in reservoir pressure ΔP. This water will displace $Q\Delta P/b$ barrels of oil per day aside from free gas and production of water.

The Operating Reservoir Pressure

The operating reservoir pressure depends on a number of factors. One of these may be the rate of water encroachment which, at a given time, is proportional to the difference between the initial and operating reservoir pressures. The lower the reservoir pressure, the faster the rate of water encroachment provided other things are equal.

On the other hand, wells have a minimum bottom-hole flowing pressure. The operating reservoir pressure relative to flowing wells is equal to the average bottom-hole flowing pressure plus the average drawdown. The pressure required to flow wells could be the controlling factor in selecting an operating reservoir pressure.

Still other factors such as pay thickness, permeability, viscosity of fluids, and volumetric withdrawal per barrel of produced oil influence the selection of reservoir pressure. When the bottom-hole producing and injection pressures are fixed, the most advantageous reservoir pressure commonly is the pressure which requires the least number of wells. These points will be connected up in later articles.

Expansion of Reservoir Liquid

Suppose the initial reservoir pressure is higher than the saturation pressure for oil. A decline in reservoir pressure is accompanied by expansion of reservoir liquid. This expansion may be anywhere from 10 to 100 bbl. per pound pressure decline per million barrels of oil in place.[2]

The oil recoverable by expansion of reservoir liquid is defined by:

$$U_o = C\,\Delta P \quad (2)$$

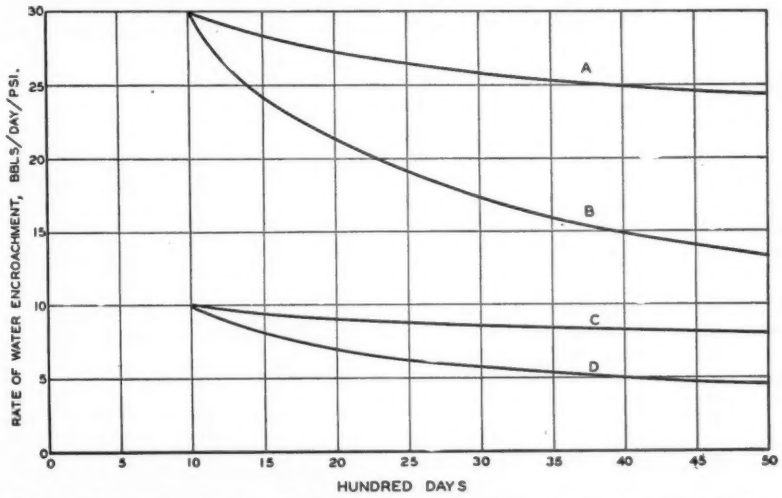

Fig. 4-1—Examples on the probable limits of the rate of edge-water encroachment into reservoirs for 10 and 30 bbl. per day per pound decline average rate of encroachment during the first 1,000 days

*Production consultant, Houston.

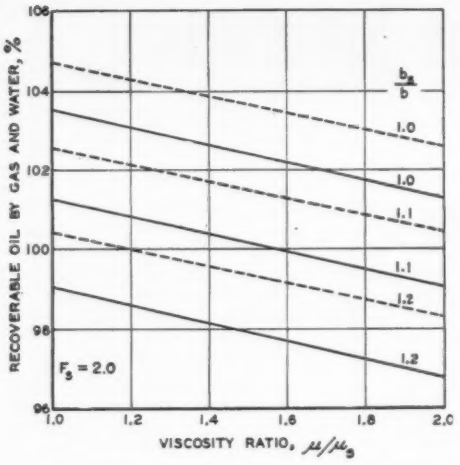

Fig. 4-2—(Left) Oil recoverable at declined pressures in per cent of the oil recoverable by maintaining pressure with water vs. viscosity ratio and volume factor ratio for 20 per cent, solid lines, and 40 per cent, dashed lines, interstitial water and fluid factor equal to 2.0 at saturation pressure.

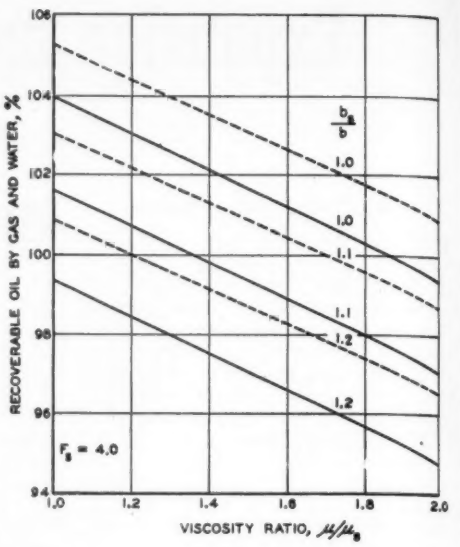

Fig. 4-3—(Right) Oil recoverable at declined pressures in per cent of the oil recoverable by maintaining pressure with water vs. viscosity and volume factor ratios for 20 per cent, solid lines, and 40 per cent, dashed lines, interstitial water and fluid factor equal to 4.0 at saturation pressure

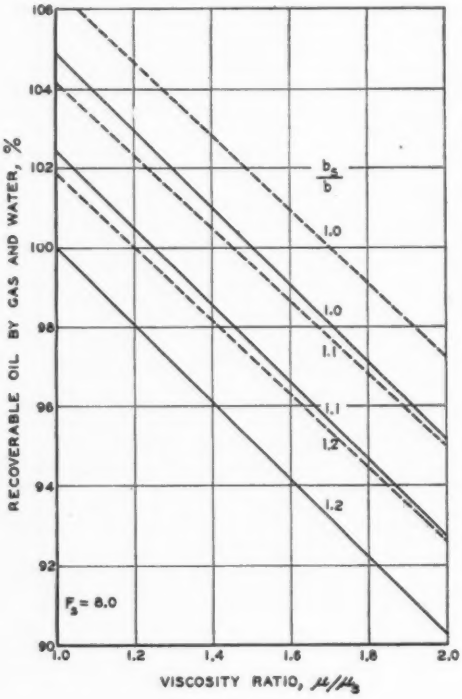

Fig. 4-4—(Left) Oil recoverable at declined pressures in per cent of the oil recoverable by maintaining pressure with water for fluid factor equal to 8.0 at saturation pressure

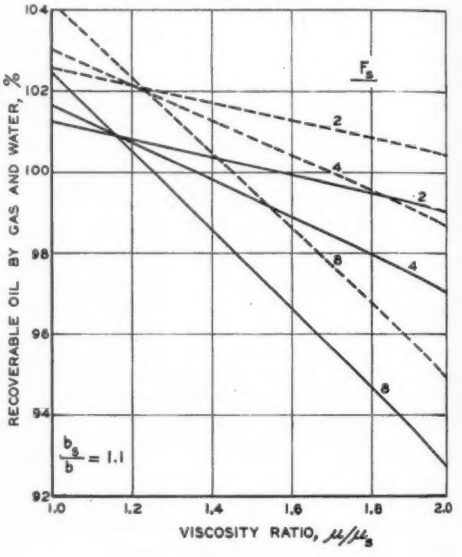

Fig. 4-5—(Right) Oil recoverable at declined pressures in per cent of the oil recoverable by maintaining pressure with water vs. viscosity ratio and the fluid factor Fs at saturation pressure for volume factor ratio equal to 1.1; interstitial water is 20 per cent, solid lines, and 40 per cent, dashed lines

where the constant C is expansion in barrels of oil per million barrels of oil in place per pound pressure decline and U_s is barrels of oil.

The oil recoverable by expansion of reservoir liquid may be anywhere from a fraction of a million barrels up to several million barrels. This recovery is available along with that by water. During the early life of a reservoir, oil production may be predominantly by expansion of reservoir liquid. Other things equal, the rate of oil production by expansion of reservoir liquid is proportional to the rate of pressure decline. Oil recovery by expansion should not be credited to oil production by water.

Other things equal, the oil-producing capacity of a well varies inversely with viscosity and volume factor, that is:

$$Q \propto \frac{1}{\mu b}$$

Volume factors increase and viscosities decrease with pressure decline down to saturation pressure. In most instances, the changes in the properties of undersaturated liquids may be neglected. However, the productivity of exploratory wells should be discounted, in some cases as much as threefold, when oil production is chiefly by expansion of reservoir liquid.

Evolved Solution Gas

Consider operating reservoir pressures which are less than saturation pressure for oil. We wish to ascertain the advantages, and disadvantages, of such producing methods. The initial pressure is assumed to equal the saturation pressure for an oil. Let the operating reservoir pressure decline to a value for which the free gas saturation is about 10 per cent of porosity. Let b_s be the volume factor at saturation pressure and b, the corresponding value at the pressure for which the free gas saturation is 10 per cent of porosity. The barrels of oil per acre-foot at saturation pressure is given by:

$$p_s = 7{,}758\ (1 - W)\ f/b_s \qquad (3)$$

The barrels of oil in place per acre foot at the declined pressure is defined by:

$$p = 7{,}758\ (0.9 - W)\ f/b \qquad (4)$$

Let U_g equal oil recovery in barrels per acre-foot by evolved solution gas. Then:

$$U_g = p_s - p \qquad (5)$$

This recovery is aside from any production by water. Suppose water does

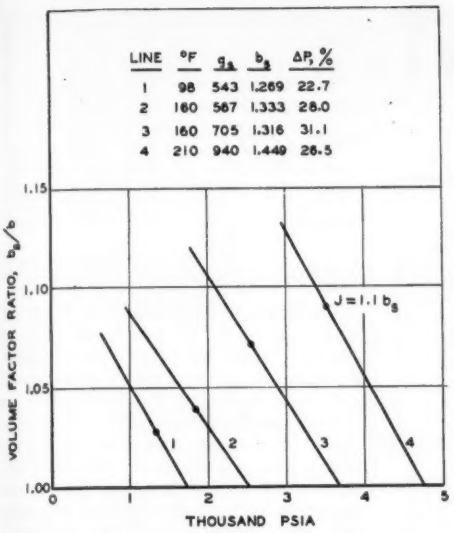

Fig. 4-6—(Left) Volume factor ratio vs. reservoir pressure; g_s is solution gas-oil ratio; b_s is volume factor at saturation pressure; points J indicate the pressure at which the volume factor of the composite is equal to 1.1b_s; ΔP is pressure decline for J = 1.1b_s in per cent of saturation pressure

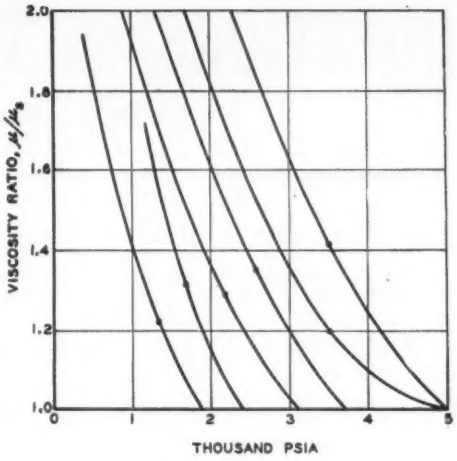

Fig. 4-7—(Right) Viscosity ratio for reservoir liquids; points on curves show viscosity ratios at pressures equal to 70 per cent of saturation pressures

not displace any free gas for saturations up to 10 per cent of porosity. The oil recoverable by water U_w relative to the declined pressure here considered is given by:

$$U_w = 0.01\ p\ (80 - F) \qquad (6)$$

The total recoverable oil U is equal to the sum $(U_w + U_r)$, that is:

$$U = p_s - 0.01\ p\ (20 + F) \qquad (7)$$

Suppose a reservoir is operated at saturation pressure. The recoverable oil U_s is given by:

$$U_s = 0.01\ p_s\ (80 - F_s) \qquad (8)$$

The fluid factor F relative to the declined pressure is defined by:

$$F = F_s \frac{b}{b_s} \frac{\mu}{\mu_s} \qquad (9)$$

The ratio of the oil recoverable by gas and water to the oil recoverable by water alone may be written as follows:

$$\frac{U}{U_s} = \frac{100 - \left(\frac{0.9 - W}{1 - W}\right)\left(20 - \frac{b_s}{b} + F_s \frac{\mu}{\mu_s}\right)}{80 - F_s} \qquad (10)$$

The lines in Figs. 4-2 through 4-5 are solutions of Equation 10. The solid lines are for 20 per cent interstitial water, and the dashed lines for 40 per cent.

Equilibrium Free Gas Saturation

Figs. 4-2 through 4-5 are based on the assumption that the equilibrium saturation for evolved solution gas is on the order of 10 per cent of porosity. When free gas evolves from solution, some of it is produced by oil and some remains within pore spaces. But free gas does not start producing itself until its saturation approaches equilibrium saturation which may be 10 per cent of porosity. Water is not likely to displace free gas at saturations less than equilibrium saturation. But at saturation greater than equilibrium values, water displaces gas. Water forces reservoir liquid into the space occupied by the displaced gas.

Operating reservoir pressures for which free-gas saturation is higher than equilibrium saturation causes a loss of recoverable oil. The volume factor and viscosity ratios are higher relative to the lower pressures. If there be any advantage, from the viewpoint of recoverable oil, in producing some oil by gas to be followed with oil production by water, the operating pressure cannot be less than the highest pressure which causes equilibrium free-gas saturation. As some free gas is displaced by a reservoir liquid during the time required to reach equilibrium saturation, the corresponding pressure is not known exactly. However, an approximation to the pressure decline at equilibrium saturation can be indicated.

Volume Factor and Viscosity Ratios

Let b_s be the volume factor for oil at saturation pressure and b, the corresponding value at any bubble-point pressure less than the saturation pressure. The ratio of volume factors b_s/b is plotted against the bubble-point pressure, for several liquids, in Fig. 4-6. Saturation pressures range from 1,750-4,750 psia. Reservoir temperatures are 98°, 160°, and 210° F. Solution gas-oil ratio g_s at saturation pressure is 543, 567, 564, and 940 cu. ft. per bbl. of oil for the four respective examples.

The composite volume factor[3] J is the space occupied by a barrel of oil and the free gas associated with the oil. The points in Fig. 4-6 indicated by J give the pressure at which the composite volume factor is equal to 1.1 b_s. At the pressure for which J = 1.1 b_s, about 90 per cent of the oil in place at saturation pressure together with the associated free gas occupy about the same space that 100 per cent of the oil occupied at saturation pressure and no free gas.

The pressure decline corresponding to J = 1.1 b_s ranges from 20-30 per cent of saturation pressure. The volume factor ratio for a 20-30 per cent pressure decline varies from about 1.03 up to about 1.10, depending on composition and saturation pressure.

The viscosity ratios commonly found in practice are given in Fig. 4-7. The points on the curves show the viscosity ratio at 30 per cent decline below saturation pressure.

Gain or Loss of Recoverable Oil

The oil recoverable by maintaining pressure with water at saturation pressure is denoted by 100 per cent in Fig. 4-2 through 4-5. All points below the 100 per cent line represent a loss of recoverable oil. The points above the 100 per cent line, within the region $1.03 < b_s/b < 1.1$ and $1.2 < \mu/\mu_s < 1.4$, represent a gain in recoverable oil for operating at pressures which may range from 75-85 per cent of saturation pressure. The data are relative to 10 per cent free-gas equilibrium saturation.

Suppose the recoverable oil for maintaining reservoir pressure with water is 100 million barrels. The following tabulations give some idea of the possible gain for reservoirs having 20, or 40, per cent interstitial water:

GAIN OF RECOVERABLE OIL, MILLION BARRELS

Viscosity ratio	Saturation fluid factor: 2	2	4	4	8	8
	Volume factor ratio: 1.05	1.1	1.05	1.1	1.05	1.1
	Interstitial water = 20 per cent					
1.2	2.05	0.80	1.90	0.75	1.17	0.5
1.4	1.15	0.25	0.90	Loss	Loss	Loss
	Interstitial water = 40 per cent					
1.2	3.20	2.15	3.30	2.15	3.50	2.30
1.4	2.80	1.70	2.40	1.30	1.70	0.50

(Continued on page 100)

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Cracking-Stock Control

What laboratory tests are used to check the recycle stock in a cracking plant? We are troubled about coke formation.—I. R. C.

A cracking stock should have a relatively low gravity, low aniline point, and low carbon residue because such a stock produces a high-octane gasoline, but the yield is somewhat low. However, nothing much can be done about the above properties because they are characteristic of crude oil available to refiners.

The real concern of the operator is to spot excessive asphaltic material that arises by entrainment, and to be sure that the fractionating equipment is removing all of the gasoline-like material produced in each cycle.

Asphaltic material can be detected by the carbon-residue test or by the tar number test. The tar number test is recommended by A. W. Trusty (Laboratory Control Cracking Still Charging Stock. . . . The Oil and Gas Journal, page 22, October 8, 1931) rather than the carbon-residue test because it can be conducted quickly. The tar number test is:

To 100 ml. of oil contained in a 100-ml. glass-stoppered cylinder add 10 ml. of 66° Be. sulfuric acid, shake for 1 or 2 minutes and allow to settle for 1 hour and 30 minutes. (Another refiner uses a 100-ml. pear-shaped A.S.T.M. centrifugal tube and centrifuges at 1,500 r.p.m. for 20 minutes.) Subtract 10 ml. from the volume of the tar to obtain the tar number. For asphaltic materials, a 50-50 mixture of the material and kerosene is recommended, and the tar number so obtained is multiplied by two.

A.S.T.M. distillation tests are conducted by many refiners about once each day as a control test. The distillation is not completed to coke, and often only the per cent distilled at 400° F. and some higher temperature, such as 570° F. are recorded.

Exact limits of tar number, carbon residue and A.S.T.M. distillation cannot be given because of the wide differences in stocks. However, one two-coil cracking plant operates as:

	Carbon residue
Topped crude charge	1.8 -2.0
Light-oil coil	0.02-0.05
Black-oil coil	0.7 -1.0
Flash-chamber overhead	0.02-0.04

One refiner operating on a distilled cracking stock finds a tar number of about 5.0 for the pipe-still charge. Between the flash chamber and fractionating tower are two vapor heat exchangers and the condensate in these two exchangers is sampled regularly. The condensates must not show a tar number higher than 15.0 (nearest flash chamber) or higher than 8.0 (the other one). If the tar number is excessive, the condensates are backtrapped to the flash chamber.

A. W. Trusty reports the following tar numbers on refinery stocks:

	Tar No.
Kerosene	0
Cracked gas (30°-36° A.P.I.)	2-4
Straightrun gas oil (30°-36° A.P.I.)	2-6
Topped crude (26° A.P.I.-E. Tex.)	26
East Texas crude	16
Fuel oil (14° A.P.I.)	100

He also reports the following carbon-residue values:

	Per cent
Kerosene	less than 0.01
Cracked (recycle) gas oil	0.005-0.02
Heavy straightrun gas oil	0.08 -0.20
Topped East Texas crude	2.5

Combustion Space

In your Refiner's Notebook on pipe-still design and operation you do not mention "combustion space." What should the combustion space be in a pipe still?—F. C. M.

Combustion space is not normally of much importance in pipe-still design because gaseous and oil fuels are the main fuels and because the allowable rate of heat absorption is relatively low. When burning such fuels the position of the flame or heat source is generally superior to that which exists in installations in which coal is fired on a stationary grate or by a stoker. The grate or stoker most of necessity be set low in the furnace box and it may not be directly opposite the tubes which absorb the heat. For this reason, unequal rates of heat absorption tend to occur. This can be tolerated to some extent in boilers because water does not tend to coke nor to deposit scale more rapidly at high absorption rates, but in oil heaters unequal rates of heating lower over-all absorption rate.

An important factor in oil or gas firing is the tendency toward impingement of the flame on the heating surface or wall, and to some extent the same applies to the firing of powdered coal. Difficulty usually arises with flame impingement even with medium furnace volumes and hence flame impingement, not furnace volume, usually becomes the limiting factor. Nevertheless, furnace volume or heat release per unit volume, may again become important in exploring the use of many burners at close proximity to the tubes.

Customary design figures of heat-release in large boiler installations are (Gaffert, Steam Power Stations, McGraw-Hill Book Co., Inc.)

Fuel—	Heat release, B.t.u./cu. ft.-hr.
Coal:	
Stationary grate	40,000-50,000
Stoker	30,000-35,000
Pulverized (dry bottom)	20,000-25,000
Pulverized (wet bottom)	35,000-40,000
Gas and oil—air-cooled walls	15,000-20,000

Stripping Residuum With Gas

Wouldn't it be possible to strip off 10-15 per cent of overhead from a cracking plant residuum (5.4° A.P.I.) by injecting gas from the stabilizer at 120 psig. into the flash chamber or by pumping the residuum to a separate vessel for stripping equipped with a pressure receiver? The A.S.T.M. distillation range is i.b.p. 380, 5 per cent 538, 10 per cent 588, 20 per cent 648, 30 per cent 692, 40 per cent 717, 50 per cent 737, 60 per cent 750 and 70 per cent 758.—J. W.

Theoretically, inert gas can be used for stripping just as well as steam but steam has been used because it can be condensed to a liquid which is immiscible with the oils. Gas would not be very satisfactory in the flash section of the cracking plant because it would make the condensation of gasoline (cracked distillate) very difficult if not impossible, it would overload the gas recovery system, and it would not be effective (compared with steam) as a stripping agent because of the high pressure and its high molecular weight.

Gas might possibly be used in a separate residuum stripper but the pressure on the stripper should be kept as low as possible, i.e., as low as handling of the gas will permit. Such an operation would be in theory exactly the same as current practice in the flashing of cracking plant residuum except that gas is employed to reduce the partial pressure rather than steam or a reduction in pressure. The method of calculation would be the same as that suggested in "Flashing Cracking Plant Residuum," The Oil and Gas Journal, page 130, August 25, 1945, except that the partial pressure should be used rather than the actual pressure.

Sulfur Nomenclature

A Correction

IN our question of October 19, 1946, page 150, the views of authors Ball and Haines of the Laramie, Wyo., Bureau of Mines were not properly stated with respect to the naming of open-chain sulfide compounds. In an attempt to gain uniformity in naming, these authors recommend that open-chain sulfides be named by the "thia" system. In addition, note that one of the carbon atoms of the compound 4,4-dimethyl 1,2-dithiacyclopentane (see Fig. 1) has one too many bonds.

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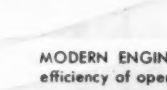

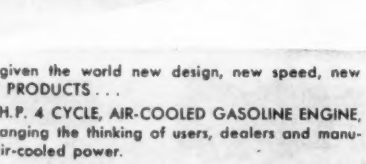

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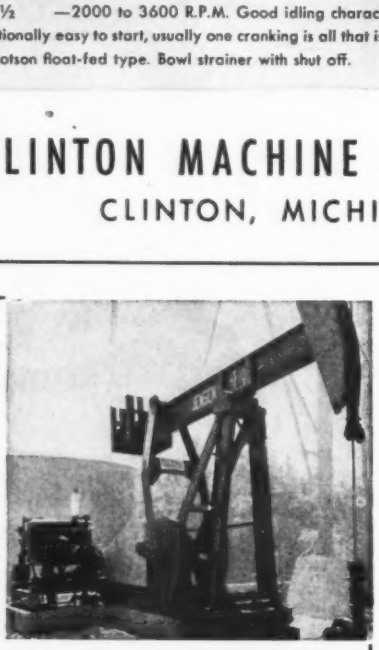

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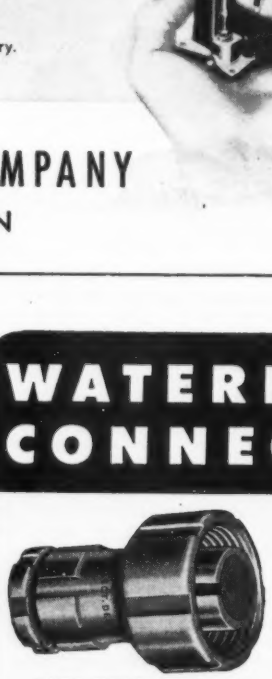

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Drilling Barge Designed For Water Operation

(Continued from page 63)

tial, in designing the barge, to provide the engine room with additional water-tight integrity to supplement the 2.5-ft. freeboard. This was accomplished by enclosing the engine room in water-tight bulkheads and a series of water-tight doors making it virtually impossible for water to gain entrance in a heavy sea or squall. When these water-tight doors are secured, access is gained to the engine room by way of two ladders, port and starboard, leading down from the upper deck or rig floor.

The Hold

In Fig. 3 it will be noted that the hold is divided into a series of 11 compartments: 3 rake, 3 port, 3 starboard, and 2 center line. The forward center-line compartment serves as the reserve mud pit with a capacity of 1,100 bbl., while the after-center-line compartment acts as the fresh-water storage with a capacity of 1,900 bbl. The compartments are connected by a 10-in. suction ballast main leading through a 16-in. manifold to the suction ends of the two mud pumps.

The barge is sunk by flooding the compartments, the flooding being controlled by four sea cocks manually operated through extension rods on the main deck.

Another interesting development on this particular drilling barge is the system of water cooling the engines. The main heat exchanger consists of three one-half longitudinal portions of 6-in. pipes welded to the hull exterior below the water line through which flows the fresh water cooling the mud-pump engines. The 60-kw. generator has its own fresh-water cooler surrounded by another water jacket, through which flows salt water sucked in through a sea cock by the generator.

The mud-pump engine exhausts are jacketed by 10¾-in. o.d. casing which serve as the conductors for the flowing water. This not only reduces the amount of heat generated in the engine room, but eliminates the majority of the noise vibration.

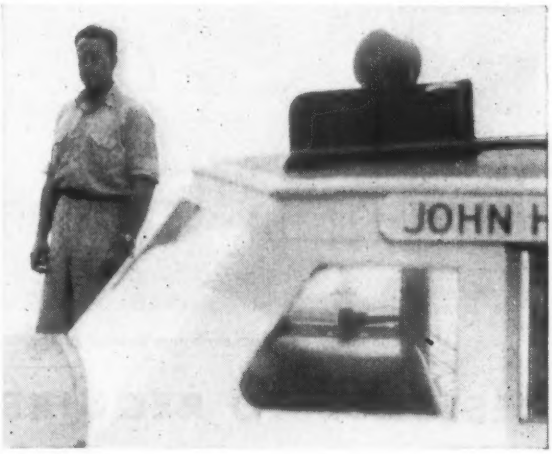
Matagorda Bay is often pounded by heavy squalls, and occasionally dangerous hurricanes move into the area. Therefore Salt Dome personnel connected with drilling operations in the bay are continually on the alert and prepared to follow a definite procedure in case of emergency.

Weather forecasts and reports are sent out over the air twice a day by the Coast Guard to all Gulf shipping. The barge radio has three frequencies, (1) ship-to-ship, (2) ship-to-shore (through Galveston Marine operator), and (3) Coast Guard. On the Coast Guard frequency, therefore, the barge receives first-hand information on weather. The action taken by those connected with drilling operations is dependent, of course, upon the text of weather reports received daily.

If a hurricane condition warranted getting the barge out of the area the drill pipe would be pulled, and during this operation circulation would be continued to replace the space vacated by the withdrawal of the pipe. The pipe would be broken down in singles. When about two-thirds out of the hole, deballasting operations with the two mud pumps would be begun. When out of the hole the master gate would be closed and the derrick laid down. Approximately 8 hours are required to place the barge in floating condition, and remaining ballast could be pumped out while en route to Palacios. Two 200-hp. Salt Dome tugs are used in towing the barge.

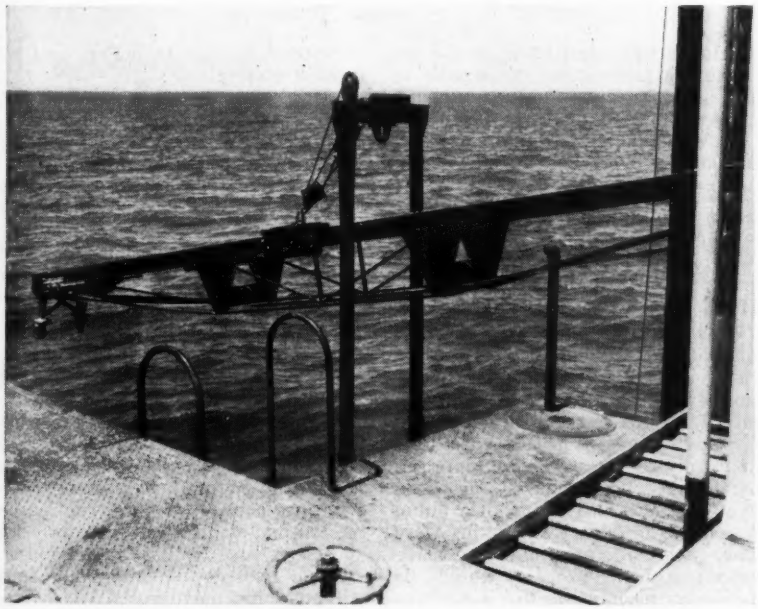
Most coastal barge operations in the past (if not all of them) have involved the use of piling. Two wells have now been drilled by the Salt Dome barge without the use of piling, resulting in a saving of approximately $10,000.

The entire Salt Dome barge (excluding the drilling rig) represents an investment to date of approximately $128,000. It was built to Salt Dome specifications by Levingston Shipbuilding Co. at Orange, Tex.



Right: Karl F. Hasselman, president of Salt Dome Oil Corp., arrives at barge in one of company's fleet boats. Company engineers credit Hasselman with unique design of barge

Below: Mud conveyor to dry-mud storage house



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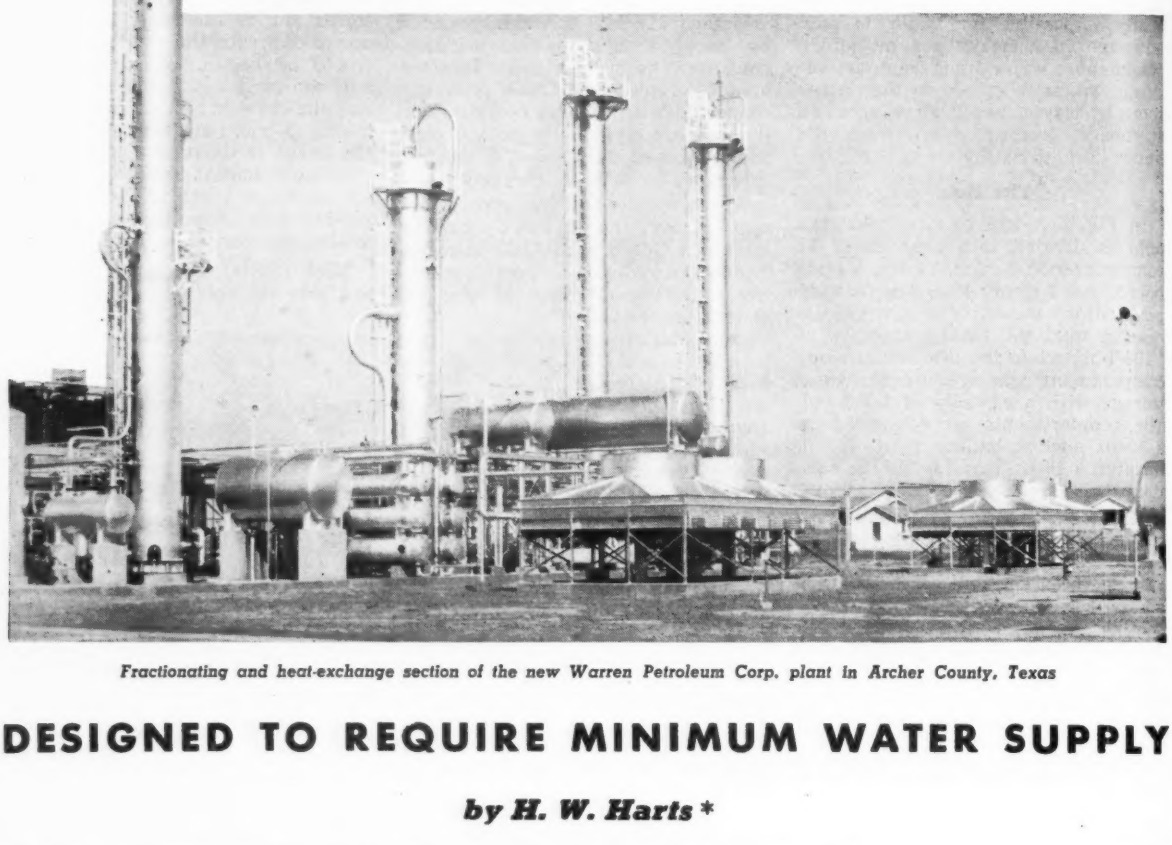
HOLLIDAY Gasoline Plant



Fractionating and heat-exchange section of the new Warren Petroleum Corp. plant in Archer County, Texas

DESIGNED TO REQUIRE MINIMUM WATER SUPPLY

by H. W. Harts *

LATE in 1945, Warren Petroleum Corp. was approached by several operators in the Hull and Silk pool of Archer County, Texas, with the idea of installing a gasoline and repressure plant in that area. Before negotiations had been completed, two other nearby producing areas were brought in and these were finally included in the over-all setup. The final agreement as mutually worked out was that the Warren organization was to gather and process all of the casinghead gas in the Hull and Silk, the Daume, and the East Holliday pools. This operation processes gas from 600 wells.

After processing, the remaining gas was to be returned to the producing horizons in the same ratio as the areas furnished. The pressure required for this repressure project ranged from 900 to 1,900 psig., depending on the age and past production of that area.

*Vice president, Warren Petroleum Corp.

(For an article dealing with the repressuring factors, see "Operators in Hull and Silk Field Study Repressuring Program," by C. H. Keplinger and J. M. Wanenmacher, in the August 31, 1946, Journal.)

The entire program as decided upon became one of considerable scope requiring more than 100 miles of pipe lines varying in size from 24 to 2 in. and approximately 5,000 hp. compressor capacity.

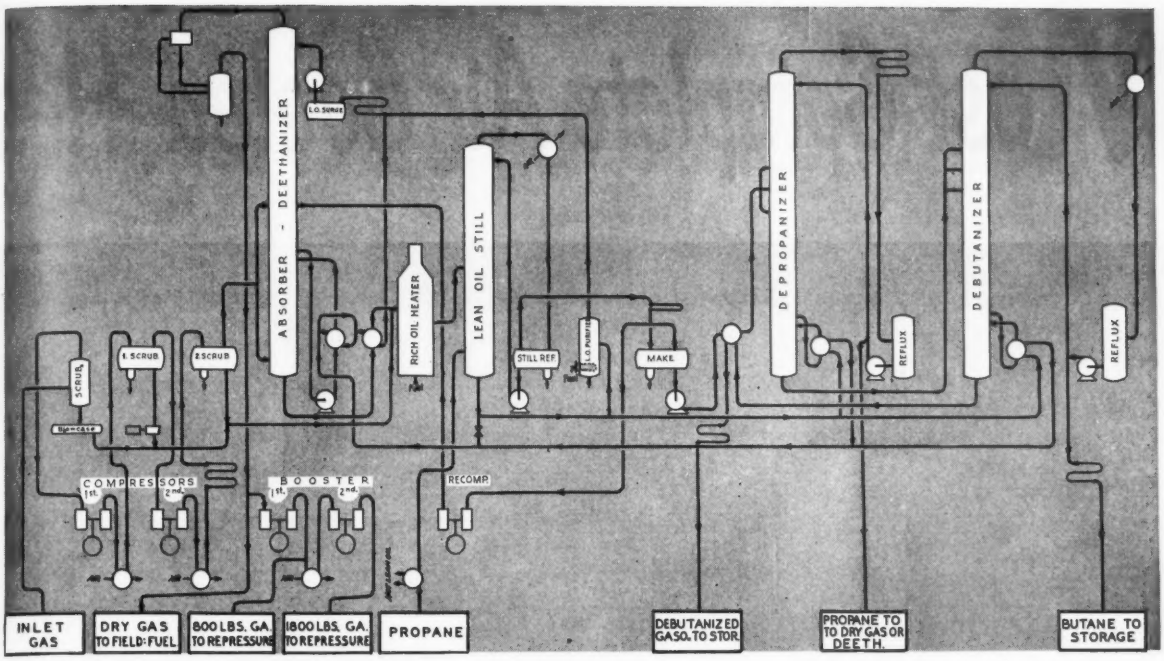
When the preliminary survey was completed by company engineers, it was found that an adequate water supply for the operation of the gasoline plant was not readily available. It would have been necessary to lay a pipe line to Lake Kemp, approximately 17 miles from the proposed plant site, and also to install a pump station at the lake. Even if this were done, an elaborate and expensive water-treatment process would be necessary, inasmuch as this water was very poor for use in boilers and for process cooling.

After serious consideration and study, it was deemed advisable to depart from the conventional type of gasoline-manufacturing plant in order to reduce water requirements to a minimum. This was planned by eliminating any steam-generating plant entirely by the installation of a direct-fired oil heater—this heater to supply all the heat required in the entire plant which includes:

1. Rich oil to still
2. Reboilers for the fractionating columns
3. Heating to the various buildings

It was planned to install fin-tube air coolers, of the induced-draft type, to cool the engine-jacket water, first-stage gas coolers, primary cooling on the second-stage gas, primary still overheads, and debutanizer condenser.

Steam was to be eliminated as a still-stripping medium, by use of de-



Schematic flow diagram showing major processing equipment and handling of streams through to finished products

propanizer overhead condensate which would be flashed into the still after being heated through exchangers by hot oil from the direct-fired heater. Water would then be necessary only for engine-jacket makeup and for final cooling on the following:

1. Second-stage gas (summer only)
2. Absorber intercooler
3. Lean oil coolers
4. Still overhead condenser (final cooling only)
5. Depropanizer overhead
6. Debutanizer base
7. Butane cooler.

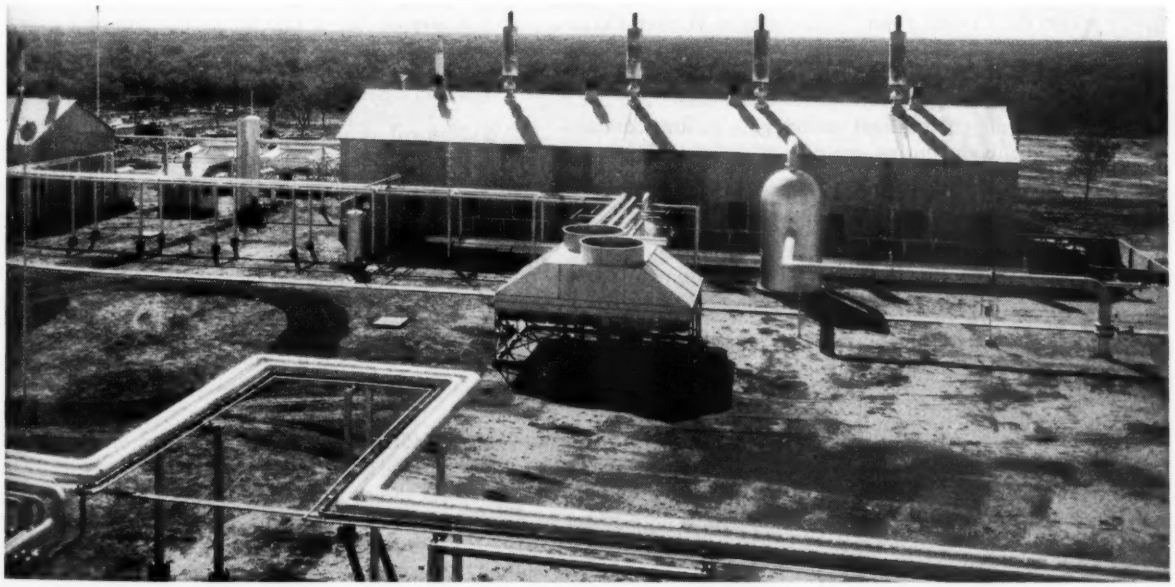
The water from the second-stage condensate was to be utilized as jacket-water makeup and a portion of the cooling-tower makeup.

Preliminary process work indicated that this plan was sound and would show a considerable saving in operation and maintenance, although the original cost might be some higher.

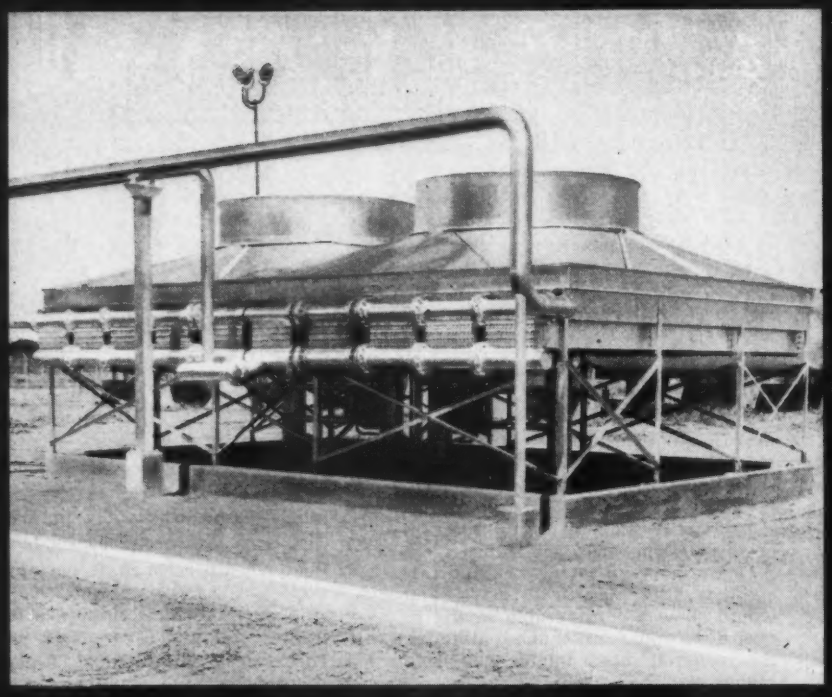
The design was based on the following:

1. Volume to be processed, 16,000,000 cu. ft. per day
2. Inlet pressure at plant, 5 in. Hg.
3. Discharge pressure, 200 psig.
4. Compress 6,000,000 cu. ft. per day of residue gas to 800 psig. and 2,000,000 cu. ft. per day of residue gas to 1,800 psig.
5. To extract a minimum of 60 per cent of propane, with equipment designed to increase this extraction by

Compressor building at the new plant. There are five 625-hp. compressors and arrangements for boosters for compressing residue gas to 800 and 1,800 psi. for repressuring. Note air-cooled heat-exchanger units



Most Complete Air Cooled Heat Exc



ALCO Air Cooled Heat Exchangers at Warren Petroleum Company's natural gas plant, Holiday, Texas, built by J. F. Pritchard Company, perform a greater part of all cooling operations than has ever been done before by air cooled heat exchangers in any comparable plant in the entire world.

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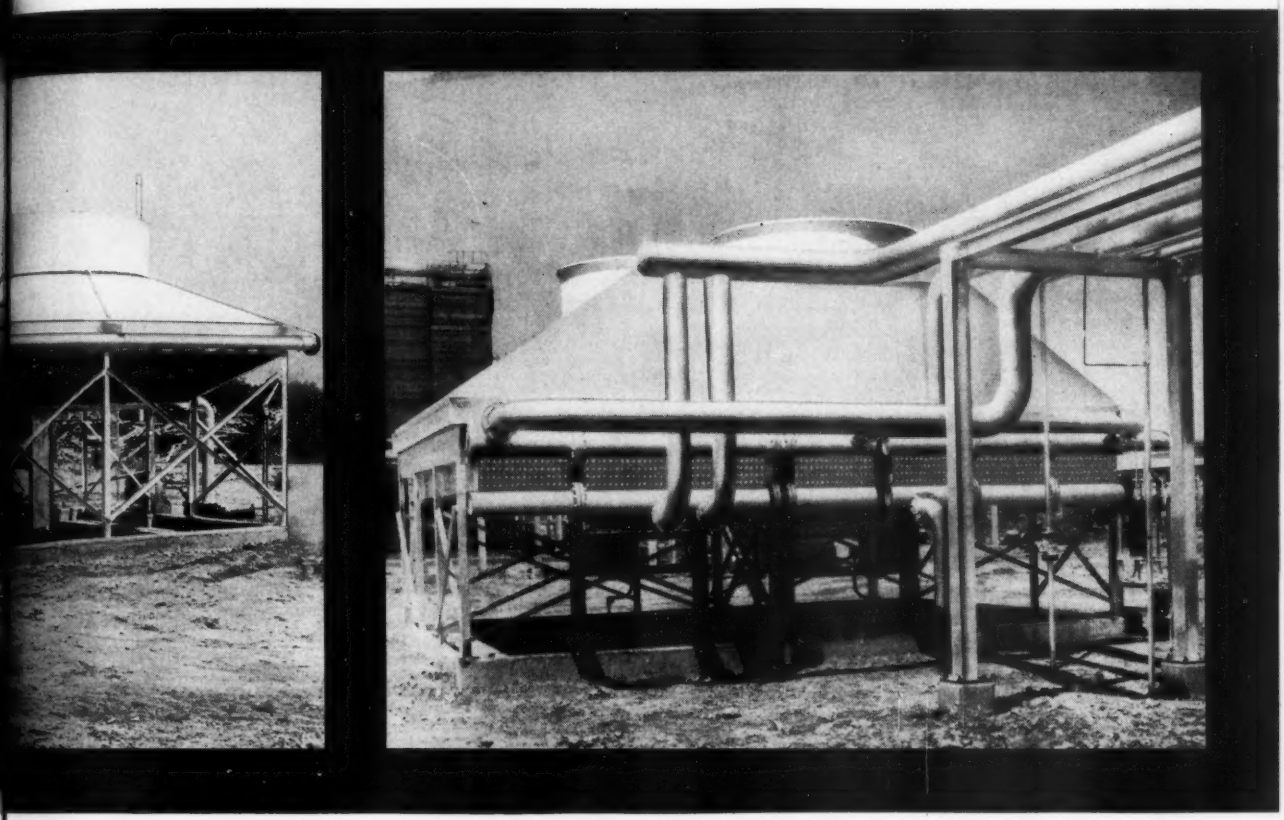
TWO TYPES OF ALCO AIR COOLED HEAT EXCHANGERS. ALCO is in a position to give impartial counsel as to which type of cooling surface—*radiator core* or *fin tube*—to employ, since it manufactures both types.

ELIMINATE THE WATER CYCLE. ALCO Air Cooled Heat Exchangers eliminate the water cycle entirely—dissipate heat directly to the air in one operation. Where water is scarce, or has a high impurity content, this feature is invaluable. Other advantages are:

1. Wind direction does not affect efficiency.
2. Natural draft construction increases efficiency of unit. This reduces power requirements to such an extent that at times this natural draft is sufficient to provide adequate cooling without use of fans.
3. Cooling surfaces are so positioned as to minimize damage by wind-driven sand, rain, or hail.
4. Fans may be driven by any form of power.
5. Induced draft insures uniform distribution of air across cooling surface.

ADVANTAGES OF ALCO DESIGN. Selection of the type of cooling surface to be used should be determined by economics and process requirements. However, where conditions and requirements permit, use of ALCO Fin Tube

Exchanger Installation in the World



Air Cooled Heat Exchangers affords certain important advantages in addition to those listed in the foregoing. These additional advantages are:

1. Separate surfaces for separate cooling duties can be mounted in the same unit.
2. Header design permits variation of passes to suit process requirements of a given job, thus allowing selection of minimum surface within pressure drop limitations of the process while maintaining maximum velocity required for highest rate of heat transfer.
3. Orifices built into manifold-header design assure uniform distribution to entire cooling surface.
4. Bundle design of ALCO fin tube construction eliminates all air leakage.

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50 Miles 4" to 20" Pipe—Cities Service Gas Company job near Guymon, Oklahoma.
25 Miles 2" to 24" Pipe—Celanese Corporation job near Bishop, Texas.
70 Miles 2" to 24" Pipe—Warren Petroleum Corporation job near Hawkins, Texas.
50 Miles 2" to 24" Pipe—Haynesville Operators job near Haynesville, Louisiana.
Approximately 28 Miles 2" to 10" Pipe—Cities Service Oil Company and Skelly Oil Company job near Skellytown, Texas.

18½ Miles 4" to 18" Pipe—Arkansas-Louisiana Gas Company job near Shreveport, Louisiana.
17 Miles 8" Pipe—Great Lakes Pipe Line Company job near Kansas City, Kansas.
65 Miles 6" to 20" Pipe—United Gas Pipe Line job near Carthage, Texas.
15 Miles 8" to 14" Pipe—Nashville Gas System job, Nashville, Tennessee.
10 to 20 Miles 4" to 10" Pipe—Public Service Company job, Denver, Colorado.
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215 Miles 30" Pipe—Pacific Lighting Corporation, Los Angeles, California.

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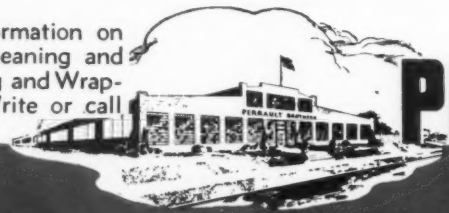

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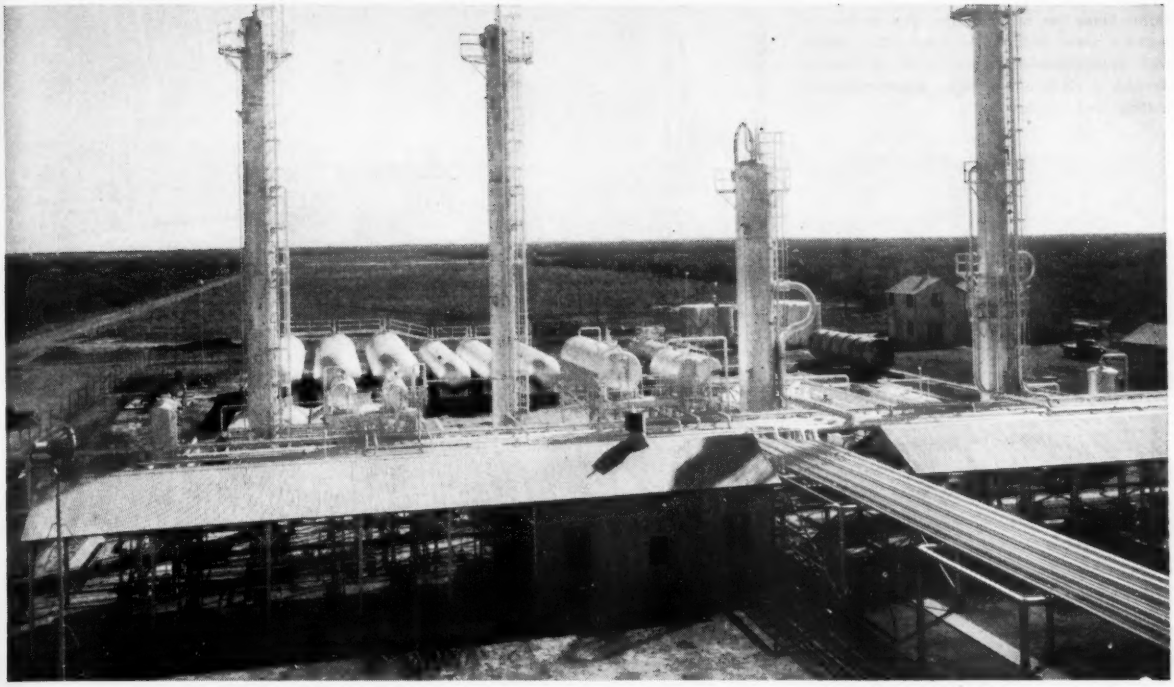


Pump houses, process lines and towers, with products storage in background. This plant manufactures about 80,000 gal. of products daily

increasing the oil rate to the absorber.

6. Field tests indicated the average gas analysis to be as follows:

Comp.	Mol. %
C_1	65.64
C_2	9.99
C_3	11.90
i-C_4	1.35
n-C_4	5.37
i-C_5	1.89
n-C_5	2.26
C_{6+}	1.60
Total	100.00

After all preliminary work was completed, the construction contract for the plant was awarded to J. F. Pritchard Co., Kansas City, Mo., while the field pipe-line system was contracted by Holland Construction Co., Tulsa. The plant design and final process figures were worked out by the contractor and company engineers in close cooperation.

Description of Process

The wet gas is gathered from the various field separators through a pipe line ranging in size from 2 to 24 in., with atmospheric pressure being maintained on the separators by the use of regulators installed on the meter runs at the separators. Upon reaching the plant, which is centrally located in the field, the gas is first scrubbed to remove any entrained liquids which might have been condensed or picked up in the line. The main gas stream is then measured and fed to the compressor plant.

Five 625-hp. compressors receive this gas and compress it through two stages to 200 psig. pressure. This gas is cooled with fin-type air coolers between stages and on the primary cooling of the second-stage discharge. The final cooling is accomplished by open sections installed in a cooling tower. It might be mentioned that these final coolers would not be necessary for the efficient operation of the plant during most of the year but are necessary during hot months, in order to reach a temperature low enough for maximum efficiency in the absorber. Ample cooling could be done by additional cooling surface in the air coils or by an increased oil rate to the absorber.

TABLE 1—ANALYSIS OF NATURAL GASOLINE PRODUCT, HOLLIDAY PLANT

Distilled at 100° F., per cent	26
Distilled at 140° F., per cent	67
I.b.p., °F.	78
Recovery, per cent	98
End point, °F.	328
Gravity, °A.P.I.	83.6

TABLE 2—INSPECTION OF TYPICAL NATURAL-GASOLINE PRODUCTION, HOLLIDAY PLANT

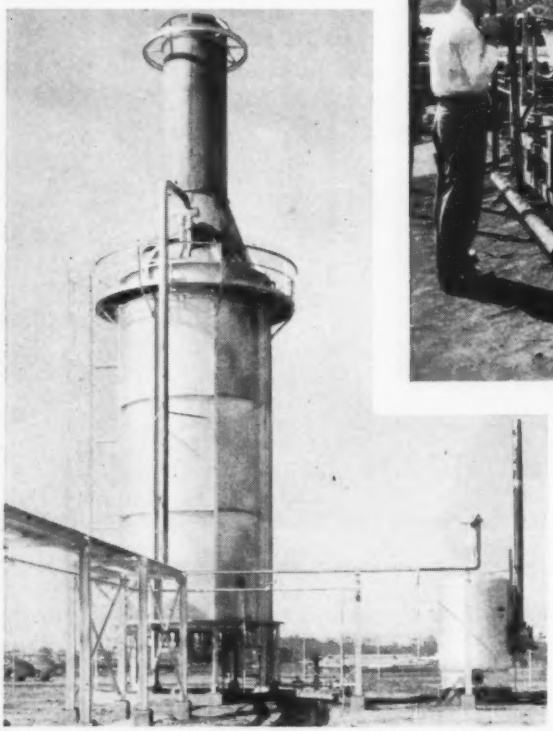
Gravity, °A.P.I.	83.6
Corrected R.v.p., lb.	17.9
I.b.p., °F.	78
Per cent evaporated at 100° F.	26
Per cent evaporated at 140° F.	67
End point, °F.	328
Recovery, per cent	98

Upon leaving the final coolers, the gas is fed directly to a combination absorber-deethanizer column. The top 20 trays of this tower are the absorption section operating in the conventional manner, with a water-cooled intercooler on the thirteenth tray down from the top of the column. A mist extractor is built in the top of the absorber and an additional mist extractor was installed in the residue gas line on the upstream side of the residue scrubber. It has been found that this will recover considerable oil from the gas, particularly if the absorber is heavily loaded.

Booster engines will pick up 8,000,000 cu. ft. per day of the residue gas and deliver 6,000,000 cu. ft. to the Hull and Silk pool for repressuring at 800 psig. The remaining 2,000,000 cu. ft. will be boosted to 1,800 psig. to repressure the Daume and East Holliday pools. Gas cooling in the two-stage booster setup is done by air. A dehydration unit of the solid desiccant type is being installed to dry the booster gas before it is returned to the field. The recovery of butanes in this absorber is substantially 100 per cent and approximately 60 per cent of the propanes are extracted with, as mentioned before, the possibility of increasing the oil rate and improving this propane extraction.

The rich oil, upon leaving the absorber section of the tower, contains appreciable amounts of methane and ethane which must either be removed at this point or in the still and fractionating system. In order to eliminate this methane and ethane, the rich oil is pumped through oil-to-oil exchangers from the bottom of the absorption section, heated, and returned to the deethanizing section of this tower where substantially all of the methane and ethane are flashed from the oil. This is accomplished by flowing

Right: Lines for some of the gas gathering systems were brought in from other areas and reconditioned. Here pipe is going through a cleaning machine preparatory to coating and wrapping



Isoflow furnace for heating rich oil to still

the rich oil down across the trays and the released vapors, together with a small amount of wet gas, which is introduced near the bottom of the section for agitation, rises through the caps and enter the bottom of the absorber. This obviously sets up a small recycle of propane, butanes, and a minor amount of heavier products; but, upon reaching equilibrium, the fat oil is stripped of substantially all of the undesirable methane and ethane, with no loss of butanes or propane which were extracted in the absorber section.

The fat oil leaving the bottom of the deethanizer section is partially heated with lean oil from the still by heat exchange and then is finally heated by a direct-fired heater and introduced into the still.

The combination still and dephlegmator is conventional with the exception that depropanizer overhead condensate is used for stripping instead of steam. This condensate is heated through an exchanger with hot lean oil and is then introduced into the still.

Heat in the lean oil leaving the still is utilized in several ways, including heating the stripping medium to the still, for reboiler heat in the fractionating units, for heating fat oil both from the absorber and deethanizer, and for heating various buildings in the plant. The lean oil is kept in good condition by taking a small side stream from the oil system and vaporizing through a direct heater, after which it is condensed and returned to the lean oil surge tank. This is a continuous operation and does an excellent job of reconditioning the oil.

The overhead vapors from the still are first cooled by fin-type coolers, the condensate from which is partially used for reflux to the still, and cooled finally by open sections located in the cooling tower. Substantially all of the still vapors are condensed by these coolers. The remaining vapors are recompressed and returned to the absorber.

Only two fractionation columns were installed in the plant, as it was only desired to manufacture natural gasoline and a butanes-propane mixture. Provision was made during construction to install additional fractionators, if and when they are desired, to make other products.

The condensate is pumped from the still accumulator through an exchanger into a depropanizer column. Overhead vapor from this tower is condensed through open sections in the cooling tower and used for reflux and for stripping in the still. The base product is pressured to a debutanizer

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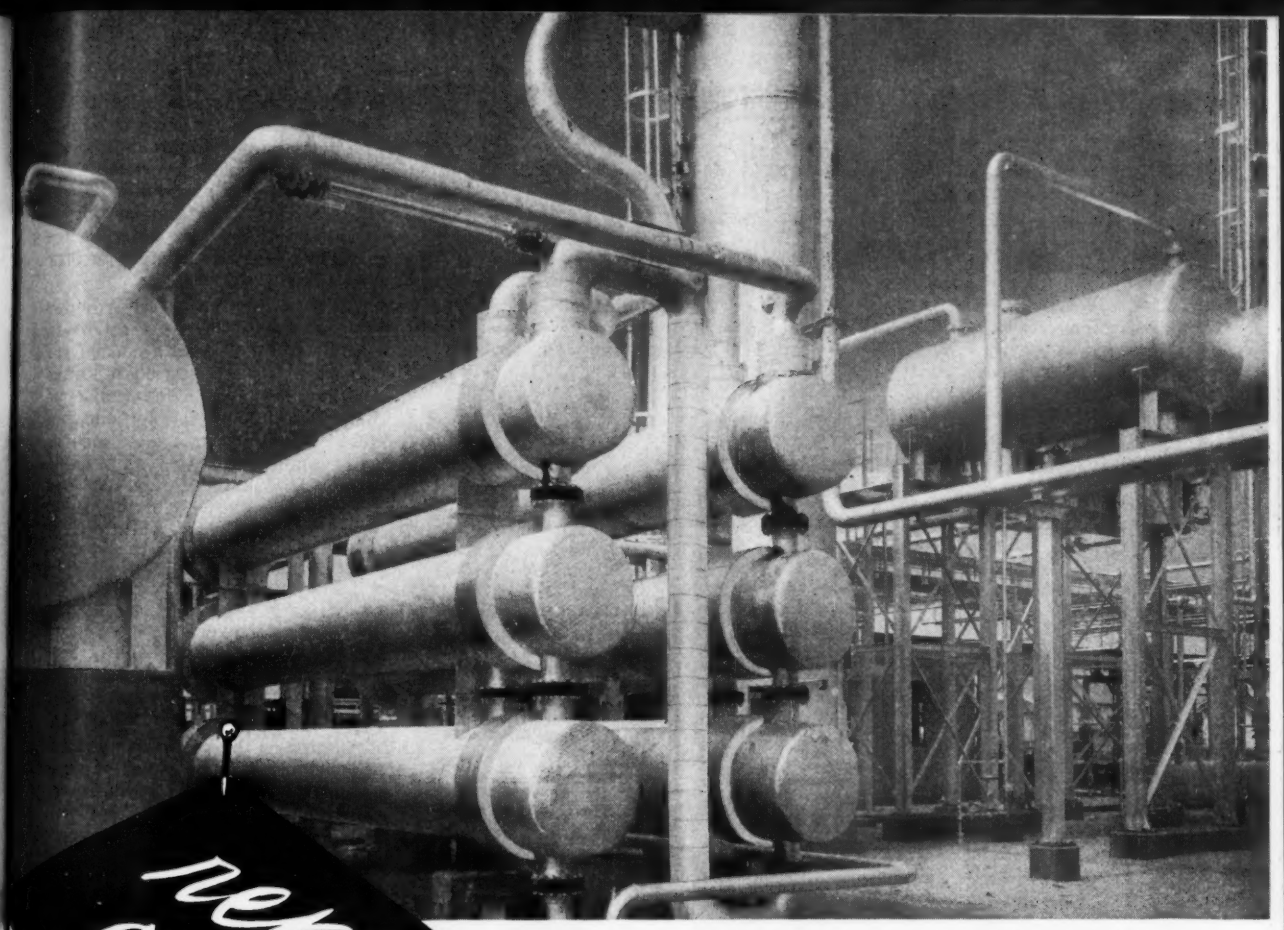

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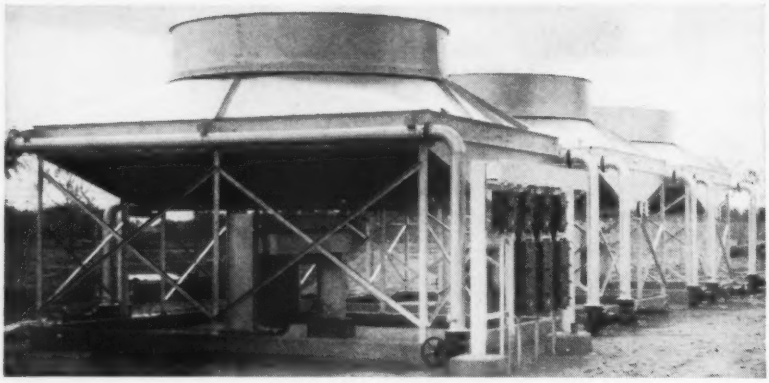


Battery of coolers for engine-jacket water makeup and certain final cooling purposes

from which the natural gasoline of any desired vapor pressure is drawn off the bottom and a butanes-propane mixture is condensed overhead. The overhead condensing is done by fin-type air coolers and final cooling of the product is done by water-cooled open type sections located in the cooling tower.

Products storage has been provided for at the plant. Three 12 by 59-ft. horizontal storage tanks are used for gasoline and three 9 by 60-ft. tanks for butane. Vertical, deep-well-type loading pumps are used to load out products to a loading dock located near the plant and to a loading rack on a spur of Wichita Valley Railroad Co., 3½ miles northwest of the plant. The loading rack has facilities for loading 10 cars at a time.

Equipment

The cooling tower is a two-coil induced-draft type with cooling sections installed below the V-pan. Vertical deep-well-type pumps are used for circulating water over the tower.

All pumps in the plant are centrifugal and are driven with electric motors, with the exception of a fire pump which is gasoline engine-driven and the jacket water pumps which are belt-driven from the compressor engines.

Electric power is furnished by three 370 hp. engines direct-connected to 440-volt, 3-phase, 60-cycle generator units, one of which is used as a standby unit.

A small soda ash, lime, and alum continuous treater was installed to treat the makeup water to the plant.

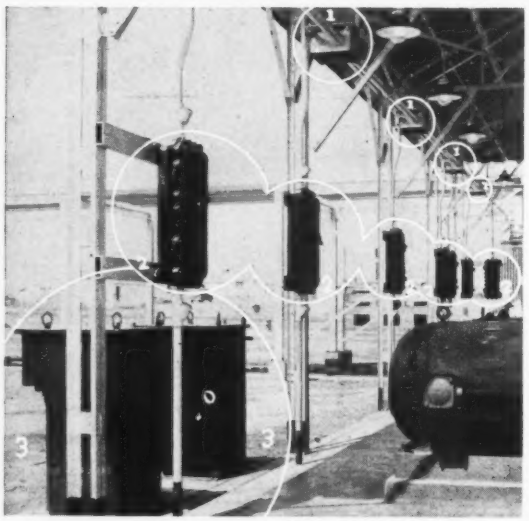
Safety shutdown equipment was provided with switches located at several points to shut down the entire plant in an emergency.

All control equipment instruments are mounted on a panel in the control room located centrally in the process area. Instruments are all actuated by air which is scrubbed and dehydrated, to prevent moisture and dirt from fouling controls.

An office was constructed near the plant and a camp was built nearby for employes.

Conclusion

This plant has now been in operation for a little more than 60 days; and, although several minor operation difficulties were encountered and corrected in starting up, the plant is operating well and is doing everything that was expected. Approximately 5 gal. of products per 1,000 cu. ft. of gas is being manufactured. From general indications, the operation of this plant will be easier than the conventional type of plant and maintenance will be considerably less than would normally be expected.



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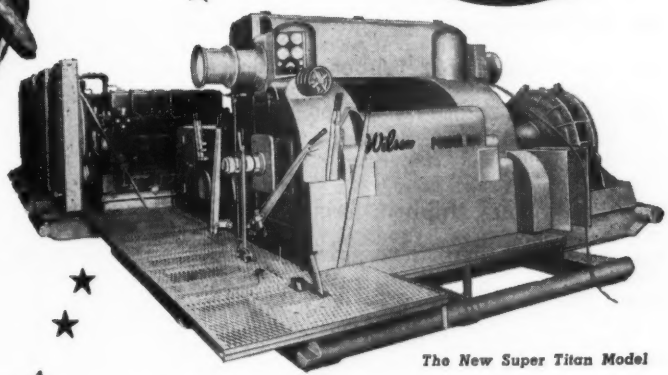

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Evaluation of

Absorber Operating Efficiency

by E. G. Ragatz* and J. A. Richardson†

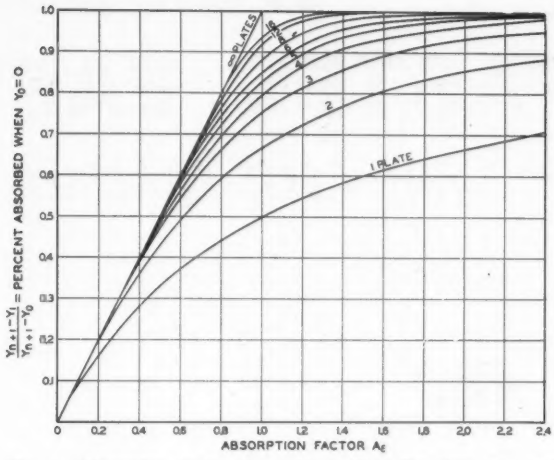

Fig. 1—Absorption factor chart. (From Mott Saunders, Jr., and G. G. Brown, Ind. and Eng. Chem. 24, 519-522, 1932)

WHILE it has been of invaluable aid in the industry, the conventional theoretical absorption-tray analysis of Kremser and Brown presents a serious weakness in that its basic "tray efficiency" factor shifts markedly in value with percentage of key component recovered. Furthermore, degree of this shifting varies widely for different columns, and for different conditions of operation of a given column. Since it is rarely possible to operate a commercial column under an exact preset condition of feed quality, column loading, and key-component recovery, this shifting of the tray efficiency limits drastically the usefulness of the conventional analysis for accurate specification definition, or for precise column-operation comparison.

The authors have recently analyzed the operating characteristics of some 40 commercial columns ranging in pressure form 30 to 1,800 psig. From this study they have developed a technique for evaluating absorber performance which utilizes an experimentally derived absorption factor chart in place of the classical Brown chart, and which gives promise of fully correcting the limitations of the conventional theoretical method.

TO date almost all industry evaluations of absorber operating efficiencies have been based on the classical absorption factor chart of Souders and Brown[1] (Fig. 1). This chart was developed from the original work of Kremser,[2] and shows the relationship existing between per cent component recovery, number of theoretical trays employed, and absorption factor "A," for an ideal absorber, i.e., an absorber wherein perfect equilibrium is achieved on each tray, and for which the values of oil and gas rate, temperature, and pressure are constants throughout the column for any one given operation.

The absorption factor "A" of this chart can best be defined as:

The ratio of the amount of a given component absorbed on a tray to the amount of the same component absorbed on the immediate tray above.

By mathematical analysis, Souders and Brown have shown that for the ideal column:

$$A = \frac{y_{n+1} - y_n}{y_1 - y_{n-1}} = \frac{L}{V} \times \frac{1}{K}$$

*Consulting engineer and †process engineer, Bechtel Brothers McCone Co. A paper presented October 11 at annual fall meeting of the California Natural Gasoline Association in Los Angeles.

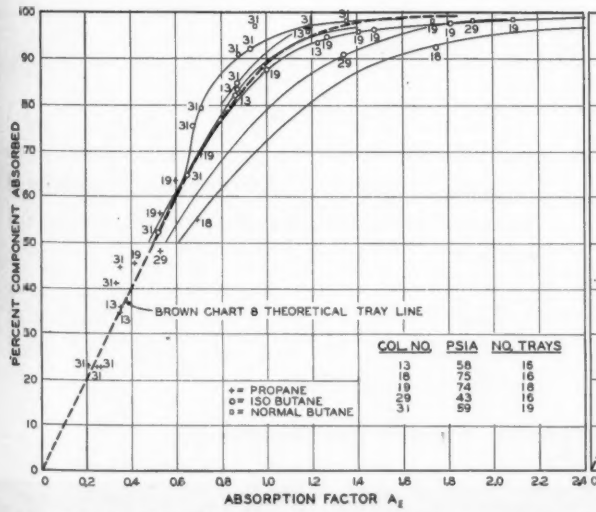
PERCENT COMPONENT ABSORBED
ABSORPTION FACTOR A_ϵ
BROWN CHART 8 THEORETICAL TRAY LINE
+ = PROPANE
o = ISO BUTANE
o = NORMAL BUTANE
COL. NO. | PSIA | NO. TRAYS
13 | 58 | 16
18 | 75 | 16
19 | 74 | 18
29 | 43 | 16
31 | 59 | 19

Fig. 2—(Left) 40-75 psia. test data, component recoveries.

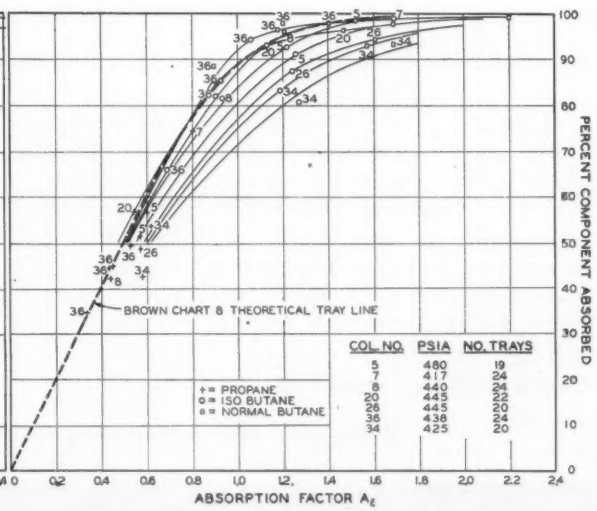
PERCENT COMPONENT ABSORBED
ABSORPTION FACTOR A_ϵ
BROWN CHART 8 THEORETICAL TRAY LINE
+ = PROPANE
o = ISO BUTANE
o = NORMAL BUTANE
COL. NO. | PSIA | NO. TRAYS
5 | 480 | 19
7 | 417 | 24
8 | 440 | 24
20 | 445 | 22
26 | 445 | 20
36 | 438 | 24
34 | 425 | 20

Fig. 3—(Right) 410-480 psia. test data, component recoveries

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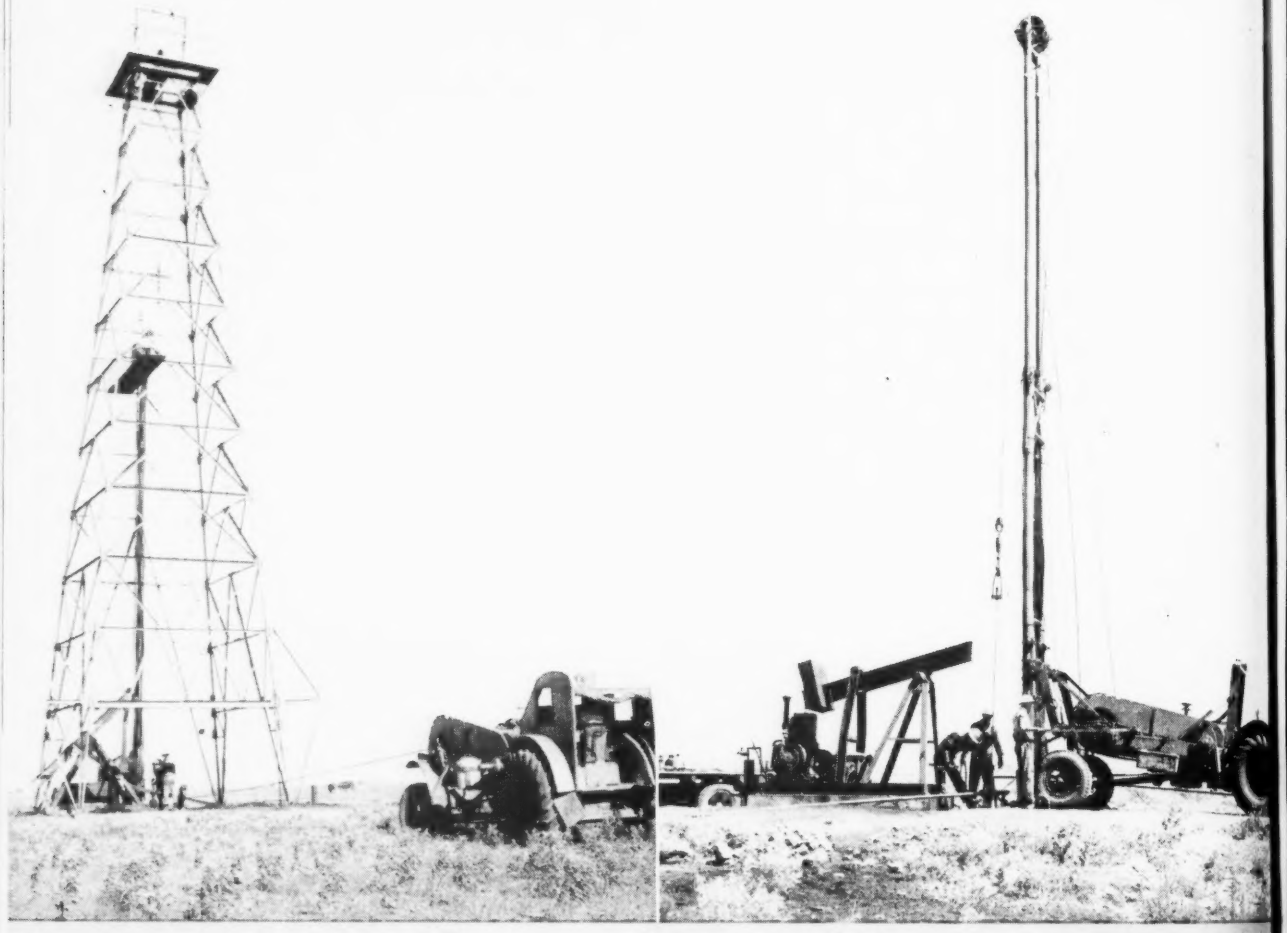

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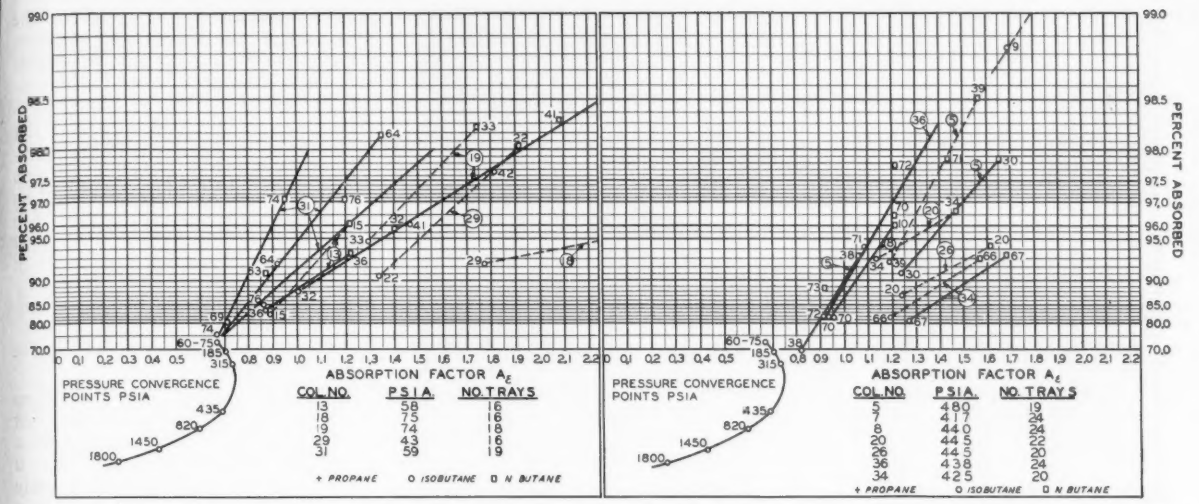


Fig. 4—(Left) Key-component recovery chart, 40-75 psia. test data. Fig. 5—(Right) Key-component recovery chart, 400-480 psia. test data

where:

- L = total moles of liquid flowing between trays
- V = total moles of gas flowing between trays
- x = mole fraction of a component in the liquid
- y = mole fraction of a component in a gas
- K = y/x = vapor-liquid equilibrium constant (a function of temperature and total pressure for each component)
- n = number of plate, starting at top plate of absorber (when used as a subscript indicates plate of origin from which the liquid overflows or the vapor rises)

Although entirely theoretical in development, the Brown chart emphasizes an extremely vital operating characteristic of all absorbers, namely:

Once a relatively small number of trays is provided, the use of additional trays in the column is materially effective over only a limited range of absorption factor values.

The reason for this limitation, of course, is inherent in the basic definition of absorption factor—since obviously, practical limits of recovery are reached with the use of only a few trays whenever the ratio of the amount of a given component absorbed on a tray to that absorbed on the tray above is substantially smaller, or larger, than 1.0.

For the narrow absorption factor range of some 0.8 to 2.0, however, both the number and absolute efficiency of the column trays are of exceeding importance, since it is over this range that the basic design of the column, with its accompanying oil-circulation requirement, is developed. Effective handling of the commercial absorption column problem calls for the precise relating of the actual column trays employed with the lean oil rates and quality, column operating temperatures and pressure, and resultant key component recoveries, over this particular absorption factor range.

From its inception, the theoretical tray analysis recognized that the physical values of L/V and K vary substantially through an actual column; that such variations correspondingly affect the true value of "A"; and that these variations increase rapidly with increasing pressure. However, it was long assumed that an effective or mean "A" factor could be developed which would average out these differences, and that through such a mean factor, the operation of an actual column could be directly related to a parallel-operating theoretical column.

If this assumption had proved correct, solution of the absorber problem would have been simple—since under such circumstances relative key component recoveries could have been accurately predicted by relating an appropriate "A" factor to its corresponding component recovery value through the proper theoretical tray line on the Brown chart. Furthermore, an exact measure of the operating efficiency of the actual column

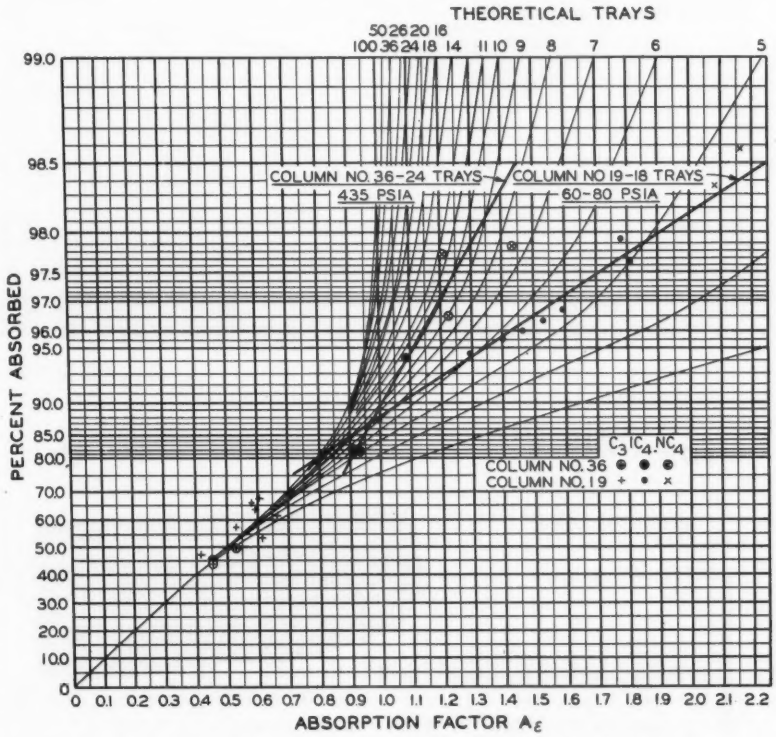
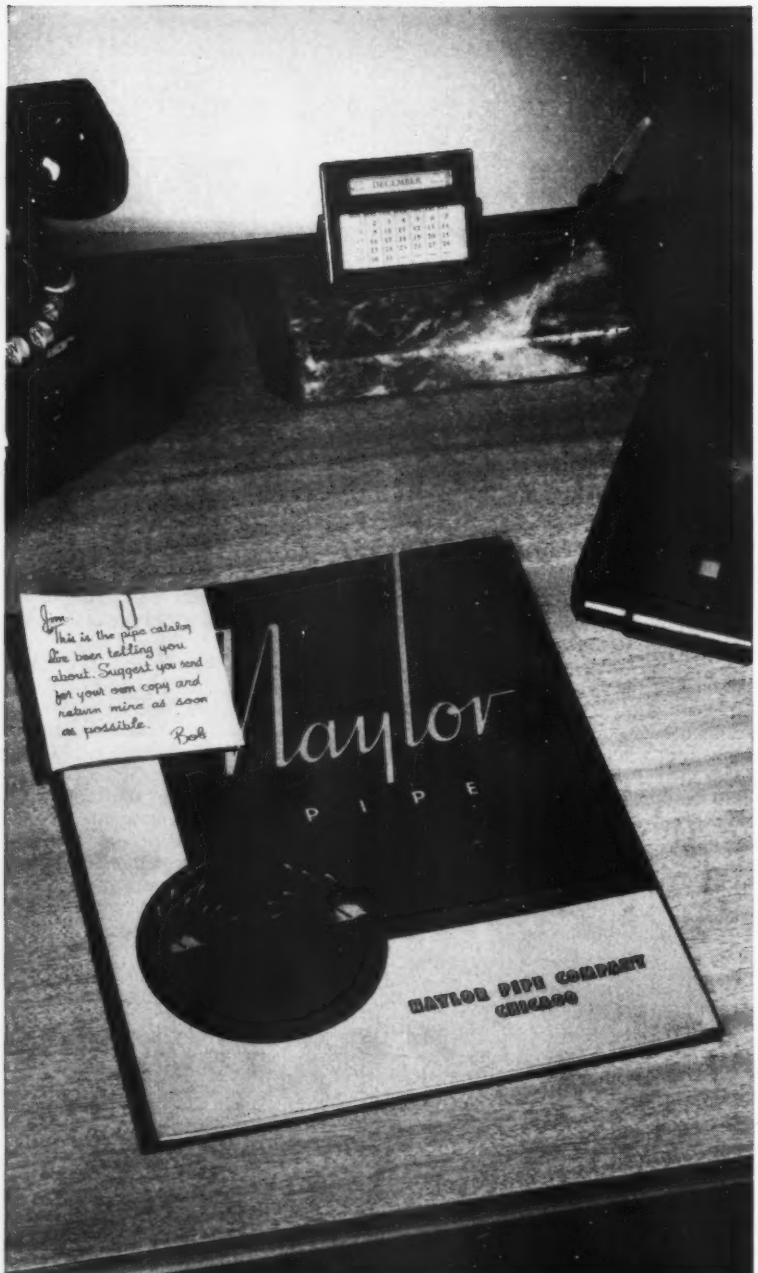


Fig. 6—Relationship between Kremser-Brown and straight-line-chart values



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would have been expressed in the ratio of the number of trays required for the parallel-operating theoretical column to those utilized in the actual column.

Unfortunately, experience has shown that no such simple relationship exists between an actual column operation and a parallel-operating theoretical unit. Instead, it has been found that the number of theoretical trays required to match the operation of an actual column shifts markedly with the percentage of key component recovered, and that the degree of this shifting varies widely for different columns.

As a consequence, the conditions of operation of an actual column must be specified (and met) exactly if a theoretical tray efficiency factor is to be used for measuring accurately a column's relative operating effectiveness. Since it is rarely possible to operate a commercial column under such predesignated operating conditions, the conventional theoretical "tray efficiency" method can rarely be used for accurate specification definition, or for precise operating column comparison.

Key to Evaluation

In seeking an improvement on the conventional absorber evaluation method, the authors concluded that continued use of a mean absorption factor offered the best means for correlating the major variables associated with the absorber operation; that the embodiment of this factor in a relative component recovery chart offered the simplest approach to absorber efficiency evaluation; and that the key to the evaluation problem's solution lay in substituting correlating factors derived from actual operating data for the older theoretically calculated factors.

Following this line of reasoning, an intensive study was made of a large number of tests from some 40 different columns ranging in operating pressure from 35 to 1,800 psig. As a result of this study, an analytical method has been developed which gives promise of having the following desirable absorber evaluation characteristics:

1. Utilizes simple data readily obtainable from presently installed commercial columns.

2. Eliminates the need for exercise of personal judgment in analyzing these data.

3. Provides an automatic check on the consistency of the test-indicated key component recoveries.

4. Predicts relative key component recoveries well within the accuracy required for precise engineering work.

5. Accurately establishes the operating efficiency of an absorber without the need of running on a precise quality of feed stock, or effecting a pre-

cise recovery of a given key component.

6. Is capable of accurate definition, and utilizes a simple number for final identification of the column's operating efficiency.

First step of our operating data analysis required the selection of a sound basis for calculating the mean absorption factor. Fortunately, this particular task had already been handled adequately by Edmister[3] in his recent analysis of Horton and Franklin's[4] proposed absorption calculation method. Edmister's mean absorption factor is based on the "A" factors existing at the top and bottom of the column, and may be expressed as:

$$A_e = \sqrt{A_\beta (A_\tau + 1) + 0.25} - 0.5$$

where:

A_e = effective or mean absorption factor

A_β = absorption factor at bottom tray conditions

A_τ = absorption factor at top tray conditions

$A_n = \frac{L_n}{V_n} \frac{1}{K_n}$ = absorption factor at tray "n"

While Edmister's original derivation assumed that K's based on the top-tray temperature would be used for calculating the top plate absorption factor, we have used "K's" based on the temperature of the fat oil leaving the bottom of the column for calculating both the top and bottom "A" factors. Justification for this simplification lies both in the character of the temperature gradient existing through the average absorber, and the fact that it has proved thoroughly workable in practice.

Having decided on a method for determining A_e, component recoveries indicated by the test data were then calculated and plotted in the conventional manner on rectangular coordinate group—charts against appropriate A_e's—with each group chart being confined to a comparatively narrow operating pressure range. Figs. 2 and 3 are typical of these group plottings, and cover respectively 40-75 psia. test data, and 410-480 psia. test data. For comparison, we also plotted on these group charts the Brown curve for an eight-tray theoretical column.

Pertinent Points Determined

Study of these group plots brought out the following pertinent points:

1. While the operating lines for the actual columns were of the same general nature as the theoretical tray lines, they departed materially from the theoretical in detail.

2. Individual test lines indicated marked column differences both in general tray effectiveness and relative component recoveries—with these differences often being evidenced by a crisscrossing of lines, rather than by a systematic line displacement as on the theoretical Brown chart.

3. The rectangular plotted operating lines were difficult to interpolate accurately in the critical 75-95 per cent recovery range due to rapid curvature in this region.

4. While it was clearly evident that some of the column tests were much less authoritative than others, no reliable criteria of general operation pattern, or individual test consistency, were presented by the rectangular plots.

These facts called clearly for a more effective graphical treatment of the data, and led directly to the development of the special "straight-line" Key Component Recovery Chart upon which our new analytical procedure is based.

With this new chart, all component recoveries between 75 and 99 per cent plot as a straight line for any given column as long as its basic tray efficiency remains constant. Furthermore, all such straight lines, irrespective of number of traps employed or degree of efficiency, can be drawn through a single convergence point for any given absolute pressure with an accuracy well within that required for precise engineering work. Finally, the characteristic operating lines remain fixed for any given

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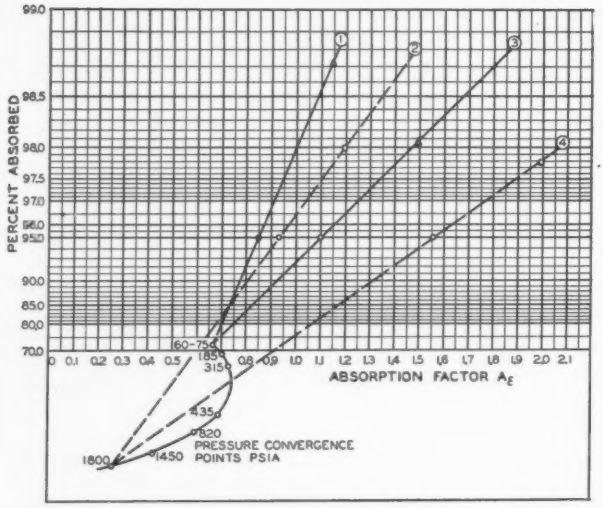

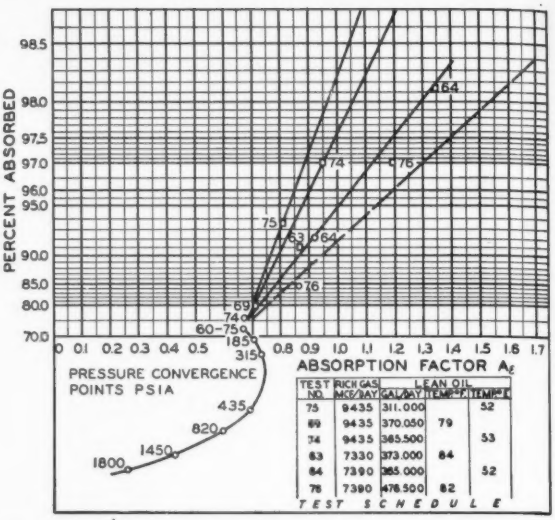
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ABSORPTION FACTOR A_ϵ
PRESSURE CONVERGENCE POINTS PSIA
60-75
185
315
435
820
1450
1800
TEST SCHEDULE
TEST NO. | RICH GAS MCF/DAY | LEAN OIL GAL/DAY | LEAN OIL TEMP °F | LEAN OIL TEMP °F
75 | 9435 | 311,000 | | 52
69 | 9435 | 370,050 | 79 |
74 | 9435 | 365,500 | | 53
63 | 7330 | 373,000 | 84 |
64 | 7390 | 365,000 | | 52
76 | 7390 | 476,500 | 82 |

Fig. 7—(Left) Comparison of column efficiencies. Efficient vs. inefficient. 60-psia. and 1,800 psia. units. Fig. 8—(Right) Effect of tray loading and lean-oil temperature. Column No. 31, 59 psia.

column over wide ranges of lean oil temperatures, and for all types of intercooled columns as long as the intercooling is confined to the upper 75 per cent of the column.

These chart features stem from a special empirical scale construction —which scale, together with an associated group of pressure convergence points, was developed directly from actual operating data, and cannot be duplicated by any theoretical analysis of which we are cognizant.

Typical examples of the straight-line chart's characteristics are presented in Figs. 4 and 5, on which are plotted the same data previously presented in rectangular chart Figs. 2 and 3. Inspection of this latter plot shows that:

1. A majority of the operating lines on each plot can be drawn as straight lines through the indicated pressure convergence points with an accuracy well within that required for precise engineering practice.

2. Where there is a conflict in the test data, as between tests 33 and 32-41-42 of column 19, or tests 15 and 36 of column 13 (Fig. 4) the "single convergence point" criteria immediately tell which particular test recovery value is in error.

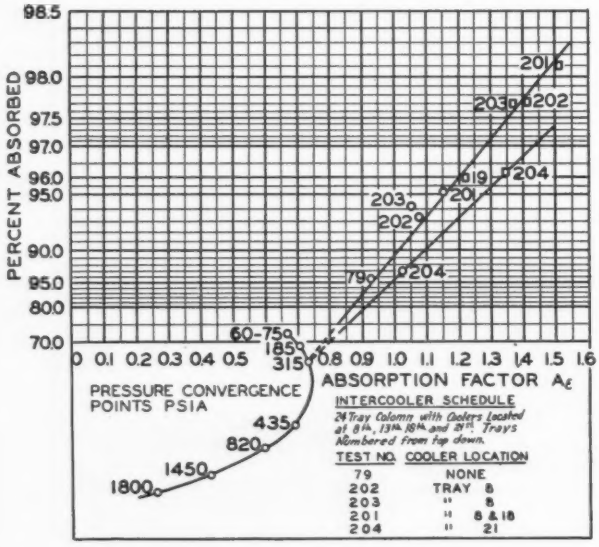
3. Where there are several well-defined lines of different slope for a given column, such as shown by tests 69 and 74 versus 63 and 64 for column 31 on Fig. 4, or tests 38 versus 39 versus 30 for column 5 on Fig. 5, a fundamental difference in basic tray efficiency is indicated.

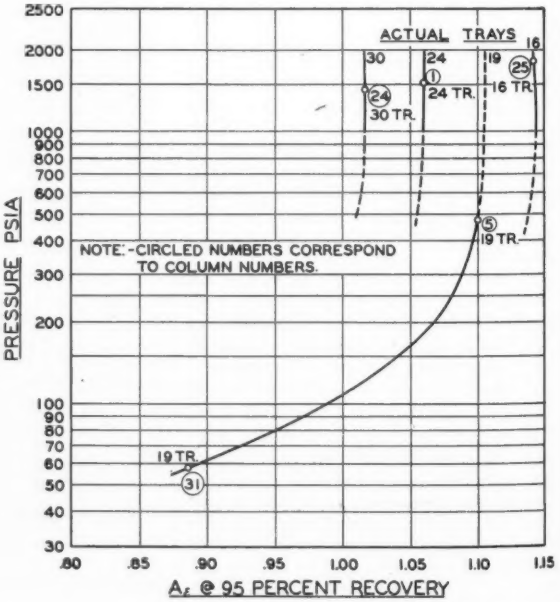
4. Operating lines which depart radically from the general operating pattern as with column 29 on Fig. 4, or column 20 on Fig. 5, definitely indicate serious error in the original test data.

Additional features of the straight-line chart are presented in Fig. 6. Here are plotted the operating line for column 19 from Fig. 4, and column 36 from Fig. 5, on a straight-line chart to which has been added a grid indicating the "Brown per cent yield versus A_ϵ relationship" for 3 to 100 theoretical trays. Also, the per cent key component yields from 70 per cent on down to 0 per cent have been indicated. These particular chart additions were made for the purpose of demonstrating:

1. The wide changes in Kremser-Brown theoretical tray efficiency

Fig. 9—(Below) Effect of tray intercooling. Column No. 38, 315 psia.
Fig. 10—(Right) Maximum operating efficiencies





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shown by a single column operating at a given basic tray efficiency as its per cent recovery of key component is changed.

2. The marked difference in relationship existing between per cent recovery and A_e for recoveries of over 75 per cent, and under 60 per cent.

The wide changes shown by the theoretical Kremser-Brown tray efficiencies of Fig. 6 are typical. Also, it should be noted that while 24-tray column 36 ranges through an increasing theoretical tray efficiency of 16.5 to 44.2 to 34.6 per cent in going from a 75 to a 98.5 per cent key-component recovery, 18-tray column 19 goes through a reverse, or decreasing, efficiency range of 100 per cent down to 25 per cent for the same key-component recovery change. The magnitude and reversed direction of these two sets of tray efficiencies aptly illustrate the inadaptability of the conventional theoretical tray efficiency factor to accurate specification definition, or precise column operation comparison.

TABLE 1
RELATIVE OIL RATES AND n-C_4 RECOVERIES AT 90 PER CENT iC_4 RECOVERY

	Pct. n-C_4 recovery	Relative oil rate, per cent
60 psia. efficient column	98.71	100
60 psia. inefficient column	98.07	130
1,800 psia. efficient column	98.00	100
1,800 psia. inefficient column	97.80	170

While the test points for component recoveries below 70 per cent on Fig. 6 are somewhat scattered, it is clearly evident that one single line will well represent the average of both column operations. This observation conforms with the well-understood absorber relationship that in the actual commercial column, excess trays are always present for the "under 70 per cent recoveries," and therefore such recoveries are functions of absorption factor only—and independent of actual tray number or tray efficiency.

We have previously mentioned the empirical nature of the pressure convergence points on the straight-line chart. These points constitute an important feature of the chart, and their proper location is essential to the chart's accuracy. While the present indicated locus of such points has been defined by three fairly large groups of data (averaging 67.5, 435, and 1,450 psia. respectively) and four smaller groups, there is some question as to the authority of a portion of this material. Consequently, we may find that the presently indicated convergence point locus will be subject to some change as additional authoritative data become available.

In connection with this locus, it will be noted that the individual pressure convergence points shift substantially with pressure. This shifting is in full agreement with another well-understood absorption law, namely, that the absorption column's relative selectivity steadily decreases with increased pressure.

On Fig. 7 we have illustrated the operation of this law as applied to a pair of low and high-pressure columns. In this figure, lines 1 and 2 represent two high-efficiency units operating at 60 and 1,800 psia., respectively, while lines 3 and 4 represent two similar-pressured low-efficiency units. For such pairs of columns (with each pair operating on the same quality lean oil and rich gas) the per cent nC_4 recoveries and relative lean-oil rates associated with a common 90 per cent iC_4 recovery, are indicated on Table 1.

These figures not only indicate the differences in relative selectivity existing between high and low-pressure columns, but also emphasize the importance to oil circulation of employing high-efficiency column equipment—particularly for the higher-pressure operations.

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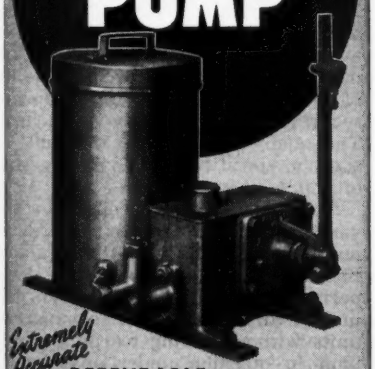

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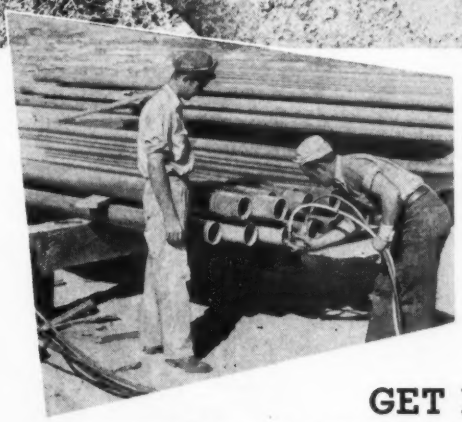

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the lean-oil temperature or tray loading at a given column is shown on Fig. 8. Inspection of this figure (covering the operation of a 59-psia. column) shows that the basic tray efficiency as measured by the slope of the operating line remained fixed for wide changes in lean-oil temperature as long as the tray's physical loads were held substantially constant. On the other hand, substantial changes in the physical loading of the column resulted in corresponding changes in its basic tray efficiency.

In this clean-cut distinguishing between changes in physical tray action, and changes in lean-oil temperature, the straight-line chart thoroughly reflects good theory.

Fig. 9 reveals the effectiveness with which the straight-line chart handles the intercooled absorber operation. For this particular test series the lean-oil and rich-gas rates were held substantially constant, while the number and location of active oil coolers were changed. As shown on the chart, this control resulted in a single operating line for those four tests which utilized coolers in the top 75 per cent of the column. For the fifth test (No. 204) wherein cooling was employed near the bottom of the column, a second, less-efficient, operating line is indicated. Here again the straight-line chart reflects a well-understood absorption law, namely, that the most effective cooling is that applied to the upper section of a column.

We have previously indicated that a column's relative effectiveness is measured by the slope of its operating line. The reason for this, of course, resides in the factors composing $A\epsilon$ —which for small changes in column control, make $A\epsilon$ substantially proportional to the lean-oil circulation rate. Under these circumstances, the steeper the operating line the smaller the value of $A\epsilon$, and the smaller the quantity of lean oil required for a given key-component recovery. Consequently, that column which exhibits the steepest slope for a given operating pressure is the most effective, and when several columns containing the same number of trays are concerned, the most efficient.

When this efficiency relationship is coupled with the fact that all operating lines for all columns can be drawn as straight lines passing through unique pressure focal points, it is seen that only one additional operating point need be located to completely identify a column's effectiveness (or efficiency). If this additional point is then located on a conveniently chosen "per cent recovery" reference line, the column's effectiveness at any given pressure can be accurately identified by a single "efficiency rating" number, i.e., by the value of $A\epsilon$ for that particular reference per cent recovery. In our work we have chosen 95 per cent for this reference base.

Checking Effectiveness

Proper utilization of these straight-line-chart relationships makes it possible to accurately specify, and check, a column's effectiveness without the need of running on a precise quality of feed stock, or effecting a precise recovery of a given key component. The many advantages inherent in such a specification flexibility are, of course, obvious.

And back of these specification advantages lies another extremely interesting possibility of the straight-line chart, namely, accurately comparing the operation of a given column with the best of commercial units without having to run the column in question under any particular preset conditions of control.

Unfortunately, full attainment of this second goal is dependent on the analysis of a great deal more operating data than appears available at the moment. However, we have made a start in this direction with the results shown on Fig. 10.

On this chart we have plotted values of $A\epsilon$ at 95 per cent recovery against the log of the absolute operating pressure for the most efficient

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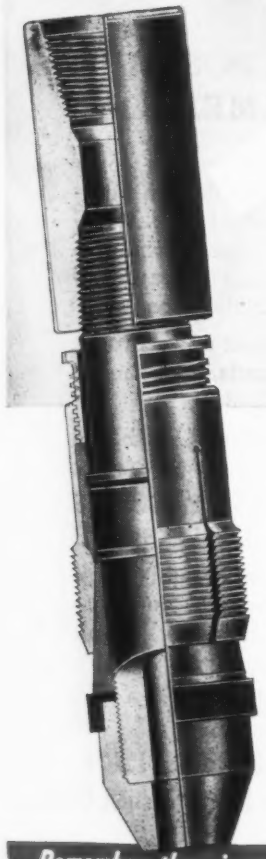

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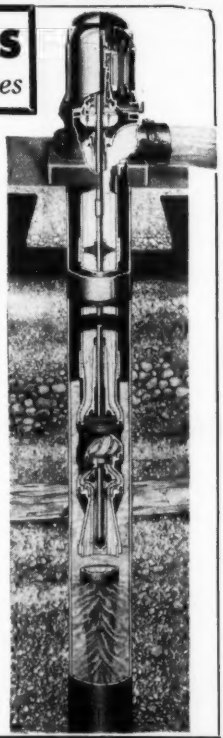

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columns studied to date—with the number of trays utilized in each column being noted, and lines of fixed tray number being drawn through them. If sufficient high efficiency data were available, such a chart would clearly specify the complete range of operation of the industry's most efficient units. In our case, however, it merely indicates what may be accomplished in the future.

Our meager results are presented for what they are worth. While we have no means of knowing whether or not the subject columns were operating at approximately the same relative efficiency, it is interesting to note that a rough pattern is established which exhibits the proper relationship between $A\epsilon$ requirements and number of trays employed. While crude, it is certainly a first step in the right direction—namely, to make possible for the plant operator to determine quickly and accurately whether or not his own plant equipment is up to the industry's best standards, and if not, in what degree it departs from that standard.

To us, the most outstanding feature of this first attempt at an overall industry column comparison was that out of some 40 columns analyzed, only 5 units fully qualified for inclusion in the maximum efficiency grid—with 2 or 3 others presenting some evidence that with more complete testing they also might have made the grade.

In other words, only 20 per cent at the very outside of all columns studied were operating at efficiencies approximating the industry's best indicated standard at the time of testing—which fact is certainly a challenge to both the operator and the designing engineer.

In meeting this challenge, an accurate and consistent measure of column performance is the first essential. For this service we offer a new process tool, the straight-line chart—confident that it will live up to its initial promise of evaluating consistently the absorber performance throughout its operating range.

In closing, we wish to acknowledge our heavy indebtedness to the many individuals and companies who have so generously contributed data to this study, and without whose help this work could never have been accomplished.

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Oil Production by Water

(Continued from page 73)

The foregoing tabulations indicate gains up to 3 million barrels of oil from reservoirs having 40 per cent interstitial water and 100 million barrels of recoverable oil by pressure maintenance with water. But the gain for a similar reservoir having only 20 per cent interstitial water is on the order of 1 million barrels.

Summing up, the possible gain in recoverable oil, for operating reservoir pressures on the order of 75-85 per cent of saturation pressure, is 1 to 3 per cent of the oil recoverable by pressure maintenance with water. The 75 per cent operating pressure is a minimum for reservoirs having a high volume factor. Reservoirs having a low interstitial water content and a small volume factor at saturation pressure probably have to be operated at 85 per cent of saturation pressure for no loss of recoverable oil even if the equilibrium free-gas saturation is as high as 10 per cent of porosity.

References

1. The Oil and Gas Journal, May 12, 1945, p. 124.
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3. Ibid, May 5, 1945, p. 105.

Use of Dehydration in Combating Corrosion

(Continued from page 69)

is lower than that of the atmosphere, added precautions must be taken to dry the product to a point where it will not drop out moisture, even though its temperature is lowered rather materially.

Moisture determinations are made at varying intervals on both the suction and discharge ends of the dehydrator drums to determine just how much reduction in water content has been effected. This analysis consists of the titration of the water in the oil with a solution of iodine and sulfur dioxide in a methanol-pyridine solution, which is standard Fischer's reagent. . . .

At the time the line was constructed, bypass sections were provided at various points, and at periodic intervals these sections have been inspected to see if any corrosion was taking place; to date the results have been 100 per cent negative. In the summer of 1946, 1,300 ft. of the original line was reclaimed in connection with a change in a road crossing, and a detailed inspection of the pipe removed from this section of line has indicated no corrosion whatsoever. In fact, so far as can be determined by visual inspection, there has not been the slightest evidence of pitting or change on the interior wall. It should also be mentioned that during the 10-year period the original section of our products pipe line has been served by the dehydration process, it has not been necessary to run scrapers a single time in order to remove scale or otherwise increase the line efficiency. In fact, only one set of scrapers was ever run through the line, and then only through that section extending from Augusta to Topeka—a distance of 122 miles.

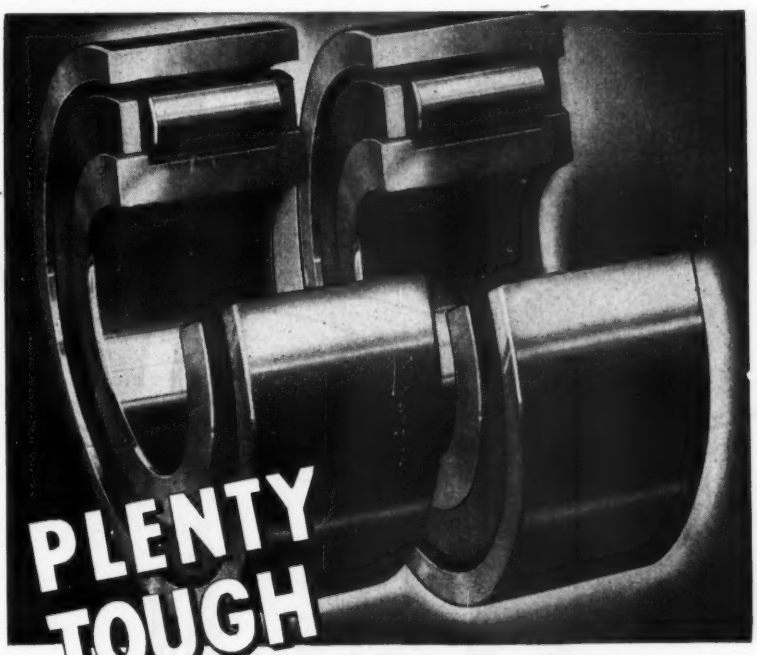
As further evidence of the high efficiency which may be expected from any pipe line where dehydration is properly employed, it is interesting to note the results of pumping tests made in January 1945, and again in March of this year on the original section of the Socony line. These tests were as shown in the table on this page.

In arriving at these line efficiencies, the T. R. Aude formula, as presented at the twenty-fourth annual meeting of the American Petroleum Institute in Chicago, November 9, 1945, was used.

Due to the fact that the pipe line under discussion operates as a closed system until the various products arrive at terminal destination, it has only been necessary to install the dehydrating equipment at the one location mentioned—namely that of the initial pump station at Augusta. Even if intermediate tankage were involved, it is not felt that additional dehydration facilities would be needed, provided that ordinary care was taken to see to it that the tank roofs were kept sufficiently tight as to exclude rain water. Naturally some added moisture might be introduced during the periods of normal breathing or while a tank was being filled or emptied. However, actual operating experience would quickly indicate if the amount of moisture so picked up would be great enough to present any serious problem. If such were the case, then further drying of the various products could be effected before they enter the line at the initial station.

During the time that the dehydration process has been in operation, not only at Augusta but also at points on other product lines operated by our company, a careful record of op-

Date	Line section, between stations	Length, miles	Line efficiency (per cent)
1/ 1/45	Augusta to Cassoday	31	96.62
1/ 1/45	Cassoday to Emporia	45	98.61
1/ 1/45	Emporia to Topeka	46½	99.46
5/26/46	Augusta to Cassoday	31	96.58
3/26/46	Cassoday to Emporia	45	97.67
3/26/46	Emporia to Topeka	46½	98.76



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erating costs has been maintained. As a result, it is felt that the total cost of dehydration, including operation, maintenance, steam, alumina replacements, depreciation, etc., will not exceed 50 cents per 1,000 bbl. of products throughput. In fact, annual actual costs at the Augusta pump station based on the daily throughput of 16,000 to 17,000 bbl. are approximately as follows:

Operation and maintenance	$600.00
Steam at 15,000 lb. per day at 20 cents per thousand pounds	1,080.00
Desiccant replacement	240.00
Depreciation	600.00
Total annual cost	$2,520.00

The above costs break down to 41 cents per 1,000 bbl.

To summarize, it is believed that the efficiency of dehydration in combating corrosion is indicated by:

1. The maintenance of line efficiencies at high level.
2. The elimination of pipe-line scrapers with their attendant hazards and operating costs.
3. The complete prevention of interior corrosion, which not only minimizes pipe replacements, but also makes for more continuous operation.

Note: In preparing this paper, an inquiry was directed to the operators of all known products pipe-line systems in the country, with the request that they furnish a memorandum outlining their experience, if any, with dehydration. Prompt replies were received from practically all of the companies contacted. However, a digest of the information obtained indicated that only Socony-Vacuum Oil Co., Inc., had used this process extensively for corrosion prevention. A major pipe line has used a limited amount of dehydration in removing cloudiness from burning oils at certain terminal locations. However, it has not, to the writer's knowledge, used dehydrating equipment for any other purpose. For that reason, this paper must of necessity primarily reflect our own experience with this process.

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This hankbook was first prepared in 1945 in the Office of the Director of Naval Petroleum and Oil Shale Reserves in the Navy Department, and although it is nothing more or less than a compilation of many other tables from original sources, it proved popular, and decision was made to maintain the handbook on an annual basis. Free use has been made of data published by the American Petroleum Institute, Petroleum Industry War Council, Bureau of Mines, and the trade press. A complete index makes it easy to find figures being sought. Figures covered include production, reserves, demand, discoveries, drilling, stocks, tank cars, year's supply, etc.

DDT—KILLER OF KILLERS. By O. T. Zimmerman and Irvin Lavine. Industrial Research Service, Dover, N. H. 1946. 180 pp. $2.75.

This book reviews man's fight against his mortal enemies — insect hordes, and the pestilence and economic loss they entail. It recites details leading up to the birth of DDT, which is a compound of carbon, hydrogen, and chlorine, bearing the name of dichloro-diphenyl-trichloroethane. And it explains how to use this effective control against common insect enemies.

A.S.T.M. METHODS OF CHEMICAL ANALYSIS OF METALS, 1946. Published by American Society for Testing Materials, 1916 Race Street, Philadelphia. 402 pp. $4.50.

This revised and greatly expanded volume gives in latest approved form all of the methods issued by the A.S.T.M. covering the chemical analysis of metals. Of particular interest and importance are several new photometric procedures. There are 35 standards, compared with 20 in the former 1943 book, and the volume provides rather complete coverage of the major ferrous and nonferrous metals and alloys.

PETROLEUM SALES TRAINING. Published by Petroleum Educational Institute, 704 South Spring Street, Los Angeles.

This 12-page booklet has to do with the essentials of sales training for oil-company salesmen. It describes the four corner stones upon which an industrial training program must be built.

BIBLIOGRAPHY OF SYNTHETIC LIQUID FUELS. Hobart Publishing Co., 506 Bond Building, Washington. 66 pp. $4.

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1947 PIPE-LINE DIRECTORY. Published by Midwest Oil Register, Tulsa.

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The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Value of Refinery Gases

THE Refiner's Notebook No. 114 of October 12, page 111-112, showed the value of refinery gases in terms of other fuels, but only heating value was considered. Most refinery gases are highly valuable because of the liquid products that can be removed from them by various processes. Such liquids are (1) natural gasoline, (2) bottle gas, (3) polymer gasoline, and (4) alkylate.

As liquid materials are extracted from a cracked gas the heating value of the remaining gas decreases because the extracted liquids have a high heating value. This was illustrated by Mekler & Becker (Air Preheaters for Petroleum Heaters) in The Oil and Gas Journal of May 22, 1941, page 88. The gas and its analysis is shown in Table 1.

TABLE 1—TYPICAL DUBBS CRACKING PLANT GAS

	Volume per cent
Hydrogen	6.4
Methane	30.6
Ethylene	5.1
Ethane	19.1
Propylene	10.6
Propane	16.8
Butylenes	5.9
Butanes	5.5

Such a gas has a gross heating value of 1,786 B.t.u. per cu. ft. (1,645 net). As the gas is processed it shrinks in volume and its heating value also decreases. Fig. 1 shows the decrease in heating value of the original gas as more and more of the gas is utilized in various processes. The left vertical scale shows the B.t.u. remaining in the residue gas from 1 cu. ft. of original cracking-plant gas. Two types of processing were contemplated in computing Fig. 1. These processes are polymerization (both selective and nonselective) and alkylation. In addition, dehydrogenation of propane and the butanes was contemplated for the highest percentage utilizations shown.

Table 2 shows the cubic feet of gas consumed and the decrease in gross heat of combustion for each gallon of liquid product produced. The table may be used in studying the economy of such processes as (1) gasoline recovery, (2) polymerization, (3) codimer manufacture, (4) alkylation of isobutane and isobutene, and (5) cumene manufacture.

TABLE 2—STANDARD CUBIC FEET REQUIRED TO PRODUCE 1 GAL. OF LIQUID AND HEAT OF COMBUSTION (GROSS) REMOVED FROM ORIGINAL GAS FOR EACH GALLON OF LIQUID PRODUCED

Material produced—	Cu. ft. required per gal.	B.t.u. lost per gal.
Propane	36.5	92,000
Propene (propylene)	45.7	107,000
Butane	31.6	103,500
Isobutane	30.8	100,500
Butene	35.2	109,000
Isobutene	35.3	108,500
Pentane	27.5	110,500
Isopentane	27.2	108,500
14-lb. natural gasoline	26.0	112,000
26-lb. natural gasoline	27.5	110,500
Poly gasoline, from propene	53.2	119,000
Poly gasoline, from butenes	40.0	122,000
Codimer, from isobutene	40.6	122,000
Alkylate, from isobutane and isobutene	38.5	119,000
Cumene, from propene and benzene	*22.6	*52,600

*Only propene comes from refinery gas. Benzene supplied from elsewhere.

Example of Table 2. — Cracked gas of Table 1 may be valued at 20 cents per M.c.f. as a fuel. The amount of poly gasoline that can be made from the propene and butylenes is:

$$\left(\frac{10.6}{53.2} + \frac{5.9}{40.0}\right)\frac{1{,}000}{100}$$

$$= 3.46 \text{ gal.}$$

At 7 cents per gallon, the gasoline alone is worth 24.2 cents, and the value of 1,000 cu. ft. of gas becomes:

$$3.46\left(7 - \frac{120{,}000}{1{,}786 \times 1{,}000}\,20\right) + 20$$

It should be noted, however, that money must be spent to build and operate the plant in order to make the extra 19.6 cents per 1,000 cu. ft.

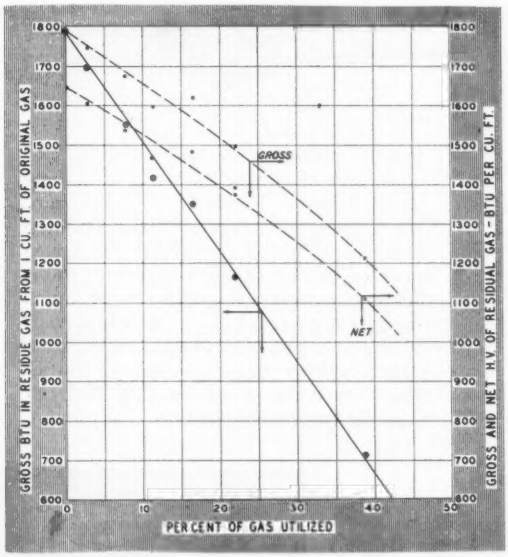

Fig. 1—Decrease in heat of combustion of 1 cu. ft. of gas as it is processed for the recovery of liquids. (See Table 1)

No. 120 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

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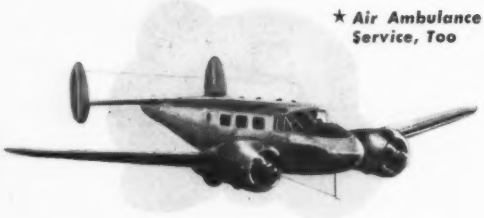

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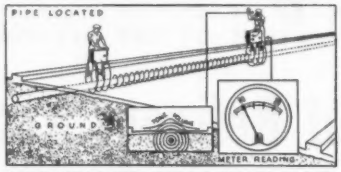

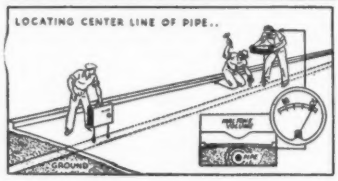

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A FEATURE OF THE OIL AND GAS JOURNAL

Lime-Soda Water Softening—The Equipment

LIME-SODA softeners may be generally classified as follows:

Cold process softening (40° to 90° F.).

(a) Intermittent or batch.

(b) Continuous—sedimentation type.

(c) Continuous—slurry pool type.

Continuous hot-process softening (212° F. or above).

The above classification does not cover scftening in the temperature range of 90° to 212° F. Cold process softening is normally conducted at the temperature of the raw supply, usually found to be in the range of 40° to 90° F. Hot-process softening requires the application of heat by exhaust or live steam to permit the softening operation to proceed at or above the boiling point (212° F.). Lime-soda softening may successfully be conducted at any intermediate temperature provided the temperature remains reasonably constant.

Intermittent softeners are operated by the fill-and-draw method. The system consists of two or more vertical tanks. One tank is employed to supply softened water while the other tank is being cleaned, filled, treated, and settled. In some cases only one tank is provided if sufficient storage capacity is available.

The system is operated on a definite cycle. The calculated quantities of lime, soda ash, and coagulant are made into a slurry in a chemical mixing tank and added to the tank while it is being filled with raw water. The full tank is agitated for a period varying from 15 minutes to 1 hour, agitation stopped, and the tank permitted to settle for as long a time as available. The clarified water is drawn off by means of a swingpipe floating at the surface and discharged to filters usually of the gravity type. This procedure is subject to variation for individual installation.

There are two essential designs of the continuous cold-process sedimentation-type unit. In the first, the raw water is intimately and continuously mixed with the proportioned quantities of lime, soda ash, and coagulant in the top of the cylindrical downtake. At the bottom of the downtake, the direction of flow of the water is changed to an upward direction and the velocity reduced. The calcium and magnesium precipitates settle to the bottom of the tank and are drawn off intermittently as sludge. The clarified and softened water is taken from a side outlet near the top of the unit. Pressure filtration of the effluent is normally employed, although gravity filtration may be utilized.

The second type of continuous cold process sedimentation softener is of basin design and is of much larger size. The raw water is thoroughly and continuously mixed with the proportioned lime, soda ash and coagulant in a flash mixer consisting essentially of a propeller-type agitator confined in a relatively small chamber. Effluent from the mixer flows through a flocculator basin, employed to insure formation of proper particle size by the action of slowly rotating paddles. The water then flows to a basin designed to permit effective sedimentation of the sludge for approximately a 4-hour period.

Continuous Slurry Pool Type

In recent years, research has provided an improved method for continuous cold-process lime and soda softening known as the slurry-pool softeners. Usually these are for large-capacity requirements.

Basically, the system operates on the principle of crystallization from a supersaturated solution by providing a contact medium for proper precipitation of the sludge. The raw water is intimately mixed with previously precipitated sludge and with the lime, soda ash, and coagulant. Initial precipitation of calcium and magnesium occurs and joins the slurry pool of previously formed precipitates of calcium and magnesium by contact. In this manner, precipitation and equilibrium are quickly established. The newly formed solids do not separate individually as small particles; instead the fresh precipitate deposits on the slurry already present by accretion. The nature of this sludge permits ready separation of the treated water from the slurry. A definite line of separation exists between the slurry bed and the clarified water with the treated effluent virtually filtered through a bed of its own sludge. The entire volume of the tank is slowly but constantly circulated by an agitator.

Softeners of the slurry-pool type are rated in capacity much the same as filters. Units are available to produce from 1 to 3 gal. per sq. ft. of surface area per minute, dependent on the design. Turbidities of the finished water of 5-10 p.p.m. (without filtration) are not uncommon. This is very good and much lower than obtained by most other methods of cold process softening. The maximum retention time of 1 hour usually specified effects appreciable savings in equipment cost, construction and floor space when compared with other cold-process methods. Chemical requirements are low and comparable to the requirements of hot process softeners. The hardness of the finished water is lower than can be obtained with other cold process units employing a given amount of chemical.

The hot process softener is normally employed as a specific external treatment for boiler feed water. The units are designed to operate at temperatures of 212° F. or above and employ live or exhaust steam as the source of heat.

The cold raw water enters through a float-controlled regulating valve to maintain a given water level in the sedimentation tank. The flow of raw water to the softener actuates a proportioning device to continuously feed lime, soda ash and coagulant. The raw water is heated to or above the boiling point in a heater which may be of a tray, jet or deaerating design. Chemical reactions to form calcium carbonate and magnesium hydroxide are practically instantaneous and due to the effect of the higher temperature sedimentation takes place rapidly. The sludge collecting cone is periodically blown down to remove the precipitates and the clarified and softened water is drawn off through the internal take-off and subjected to pressure filtration.

This material is from the Betz Handbook for Industrial Water Conditioning, written and published by W. H. and L. D. Betz, consulting engineers, Philadelphia.

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McBride, G. A., Jrnl. Amer. Water Works Assn., 31, 558-569 (1939).

Joos, C. E., Combustion, 12, 38-44 (1940).

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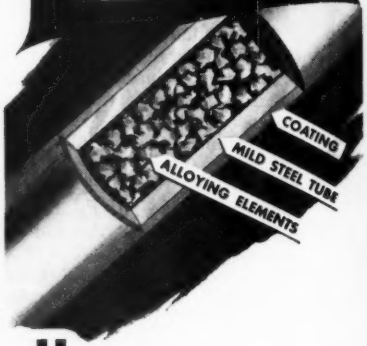

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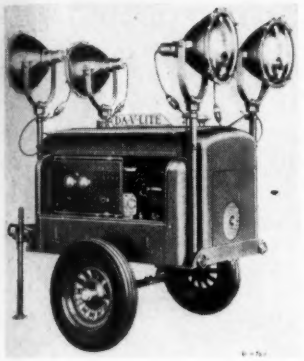
IT'S NEW CHECK IT

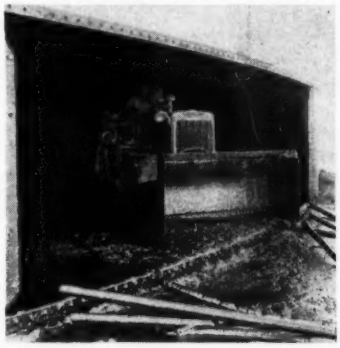
by John M. Spears



(1) PORTABLE LIGHTING UNIT provides light and power where and when needed. The 5,000-watt Westinghouse self-excited, self-regulated A-C generator is driven by a 15-hp., four-cylinder Wisconsin air-cooled engine. Standard models are floodlight, searchlight, combination, and beacon. Skid or two-wheel trailer mounted. Floodlight model is equipped with four heavy-duty 16-in. floodlights, providing 185,000 candlepower per light. Each light is individually operated from the control panel and can be raised to a height of 8 ft. 6 in. Also can be used to supplement existing power facilities. *Davey Compressor Co.*

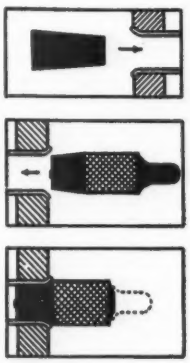
IT'S NEW CHECK IT

(2) NEW TANK-CLEANING METHOD has recently been introduced in West Texas as a labor-saving expedient. Equipped with a side-plated bulldozer blade, a diesel-powered track-type tractor is being used to clean out 80,000-bbl. tanks after the bottoms become hard packed with residue averaging 4 to 5 ft. deep. An opening in each tank is made by removal of a bottom ring sheet, permitting the bulldozer to move inside, where it gouges out the residue and pushes it through the opening. The machine cleans the bottom of a tank in 2 or 3 days. *Caterpillar Tractor Co.*



IT'S NEW CHECK IT

(3) DETECTALEAK TUBE TESTER quickly locates leaking condenser tubes without dismantling the condenser. This simple tool consists of a rubber body, with one end conical to fit into the tube, the other end a thin-walled bulb. An air passage connects the bulb with the conical end. A knurled metal sleeve surrounds the body to provide a grip for the hand. Operation includes: (see cut) (1) Maintaining vacuum in steam space with condenser steam jets, plug one end with fiber plugs. (2) Insert tube tester in other end of tube. (3) If tester bulb is sucked in, tube leaks. *Condenser Service & Engineering Co., Inc.*



IT'S NEW CHECK IT

(4) NEW ELECTRICAL BRAKE for heavy-duty vehicles consists of an electric retarder mounted on the drive shaft of the tractor and on a live axle of the trailer, employing the principle of the Eddy Current brake. The retarder is a simple form of electric generator. When excited, it produces a braking effect by generating electric current which is converted into heat and dissipated by the cooling fins of the retarder rotor. Action of the retarder is controlled by two speed and load-control rheostats mounted in the cab. One of these controls the speed at which the retarder goes into operation offering a range between 14 and 44 m.p.h. The other controls the torque on the unit. In actual operation, driver sets the first control for the desired speed and the torque control at a point commensurate with grades being traversed and load he is carrying. Because it does not

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depend on friction, the unit eliminates "fading" brakes on long steep grades. A separate system of conventional shoe brakes on all wheels is controlled by an electric-magnetic circuit operated by an ordinary brake pedal. *Warner Electric Brake Co.*

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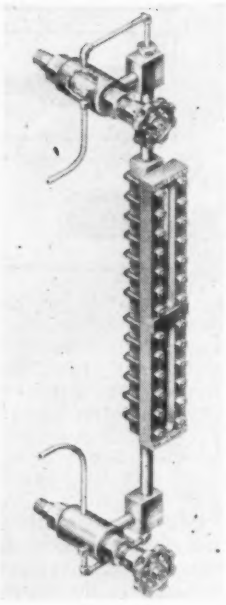
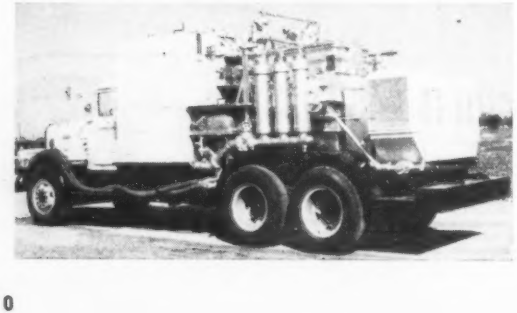


(5) NEW LIQUID-LEVEL GAGE has auxiliary tube through which gas or liquid can be circulated for raising or lowering temperature of liquid in gage itself. Unit is available in both reflex (illustrated) and transparent types. Auxiliary tube passes concentrically through liquid chamber of the gage, thus affording contact with the liquid being heated or cooled. Valves used in this assembly are jacketed so that liquid passing through them can also be heated or cooled. *Jerguson Gage & Valve Co.*

IT'S NEW CHECK IT

(6) OIL-FIELD ENGINES of the heavy-duty type (Model 400—six cylinders, 5¾ by 7 in.) are versatile in applications for extreme-service duties whether on drilling rigs, in field production work, other industry divisions. Illustrated is one on a new oil-well cementing unit at Long Beach, Calif. Modern design of these engines includes dual ignition, complete valve-actuating mechanism in cylinder head, steel-backed copper-lead bearings, alloy-steel forgings. *Hall-Scott Motor Car Co.*



IT'S NEW CHECK IT

(7) ROAD LUG TIRE for off-highway and highway service used where heavy loads must be hauled on rocky, rutty, and sticky roads. Constructed with a rayon-cord carcass. Tread and sidewalls have natural-rubber content equal to prewar construction. Has heavy layers of cushion rubber between plies and extra-heavy rayon breaker. All sizes have multiple beads of high-carbon steel wire. *Goodyear Tire & Rubber Co.*

IT'S NEW CHECK IT

(8) TRUCK-TIRE CARRIER eliminates lifting heavy wheels. To change a tire, holding clamps are released and cradle portion of carrier which holds tire and wheel is pulled out and away from the truck body. In this position tire is clear and can be tilted upright while it is still attached to the carrier. Carrier is bolted to the chassis frame of truck or trailer either at rear or side Withstands load stress equal to four times the load it carries under normal use. *T.E.D. Corp.*

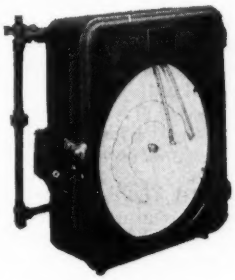
IT'S NEW CHECK IT

(9) OXYGEN INDICATOR for measuring the oxygen content of gaseous mixtures in oil and gas processing and handling. Applications include combustion and process control, gas transmission and distribution, and checking safety and corrosion factors. Equipped with electrolytic detector cell made of a hollow carbon tube and metallic plate serving as electrodes in an ounce of liquid electrolyte. Polarization in the cell causes hydrogen to be deposited on the carbon pole. When a gas sample containing oxygen is passed through the hollow carbon electrode, diffusion through the porous carbon causes the oxygen to combine with the "electrolytic hydrogen"

reducing the internal resistance of the cell and causing its current and voltage output to be increased. A direct-

reading meter, having a linear scale, indicates the percentage in the sample. *Mine Safety Appliances Co.*

IT'S NEW CHECK IT



(10) ARCCO MERCURY-LESS METER of the orifice type, measures gases and liquids under high or low line pressures. Differential pressure acts upon a strong, tough, highly resilient spring phosphor-bronze bellows. Under this influence the bellows is distended, its distension being opposed by elastic resistance of a "torsion tube." Latter transmits motion to recording mechanism outside the pressure chamber, without the necessity of any opening whatever through meter walls. No mercury or other liquid column is employed. No pivots, bearings, or stuffing boxes, consequently no leakage. *American Recording Chart Co.*

IT'S NEW CHECK IT

(11) TIME-IT ELECTRIC STOPWATCH measures split-second or split-minute time intervals. Legible indicating counter can be reset to zero from any reading, or successive readings can be totaled. Second model, with direct reading to one-tenth second, totals to 10,000 seconds (2 hours 46 minutes) before repeating from zero. Minute model indicates full minutes and 1/100-minute up to 1,000 minutes. Uses a continuous-duty synchronous electric motor. Operating accuracy is equal to the cycle constancy of alternating current. Built-in brake insures positive split-second stopping. *Eberbach & Son Co.*

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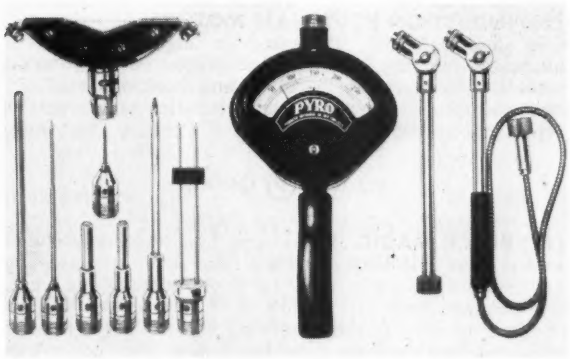
(12) SURFACE PYROMETER gives quick and accurate temperatures for plant and laboratory requirements. Self contained and portable. Immune to external magnetic influences. An internal automatic cold-end junction compensator is standard equipment. The eight different thermocouples and two types of extension arms, interchangeable without adjustment or recalibration, all are



designed to eliminate temperature gradient errors. There are five different temperature ranges, from 0-300° F. to 0-1,200° F. *Pyrometer Instrument Co.*

IT'S NEW CHECK IT

(13) MULSIREX, new emulsifying agent, removes heavy deposits of oil and light grease from all kinds of metal parts and equipment. In solution with petroleum cleaning agents, Mulsirex adds to the cleaning potency of these agents through its penetrating qualities. Emulsifying characteristics of this product make foreign substances readily soluble in water, a feature that permits deposits to be flushed away after application of cleaning agent with simple cold-water rinse. *Turco Products, Inc.*

IT'S NEW CHECK IT

TRADE LITERATURE

(14) COOLING TOWERS AND UNITS. Illustrated description of cooling towers and units, gas cleaners, mufflers, and associated engineering services presented in 20-page brochure. Various charts, tables, and flow diagrams given. Applications are shown by plant and laboratory photographs. *The Fluor Corp., Ltd.*

IT'S NEW CHECK IT

(15) OIL-FIELD EQUIPMENT. A 51-page condensed catalog describes various equipment for rotary drilling, cable-tool drilling, production, and servicing. Miscellaneous section treats steel buildings and flare towers. Illustrated. Complete with performance characteristics and specification tables. *International Derrick & Equipment Co.*

IT'S NEW ✓ CHECK IT

(16) INDUCTION POLYPHASE MOTORS. Slip-ring motors described and illustrated in eight-page bulletin adaptable for ring binding. Photographs cover complete motors, stators, rotors, bearings and bushings, and mechanical forms. Operating characteristics and graph of typical speed torque curves included. *Century Electric Co.*

IT'S NEW ✓ CHECK IT

(17) BLACK MAGIC. Pocket-size booklet gives detailed information on oil-base drilling fluid primarily used for drilling into the producing zone to eliminate water blocking and mudding off. Fluid's zero filtrate loss enables operator to drill through heaving shale. Covers mixing, additives, testing procedure, equipment, and water-base drilling fluids. Table of contents and 20 pages of size and capacity tables. *Oil Base, Inc.*

IT'S NEW ✓ CHECK IT

(18) GAS-ENGINE-DRIVEN COMPRESSOR. Liberally illustrated bulletin describes semiportable, self-contained compressors. Twenty pages including four pages of dimensional drawings. Stresses skid mounting and compactness. End and side photographs show design and principal units. *Clark Bros. Co., Inc.*

IT'S NEW ✓ CHECK IT

(19) MINERAL-WOOL INSULATION. New 20-page manual gives definitions, conditions, and formulas for determining heat-loss economics on many tpyes of equipment. Nine case histories, illustrated and described in detail, cover a variety of typical situations where heated surfaces wasted fuel dollars until insulation was installed. *Industrial Mineral Wool Institute.*

IT'S NEW ✓ CHECK IT

(20) CONTINUOUS INDICATING TACHOMETERS. New 15-page, 2-color catalog illustrates and describes in detail manufacturer's line of portable and fixed tachometers. Adaptable for loose-leaf binding. Bulletin covers operation and application of each type with line drawings giving dimensions. Construction features, drive ratios, and ranges included. *Jones Motrola Corp.*

IT'S NEW ✓ CHECK IT

(21) SHRINKAGE OF CONCRETE AND MORTAR. Its important influence on durability and serviceability, the principle factors affecting it, and its control and elimination are discussed in 34-page booklet. Explaining principle of specially prepared metallic aggregate in controlling shrinkage, booklet describes use of Embeco for machinery and heavy equipment, grouting, cement-gun work, and patching and repairing concrete. Charts, graphs and technical data included. *The Master Builders Co.*

IT'S NEW ✓ CHECK IT

(22) IMPROVEMENTS IN JACKS. Complete descriptions, data, and specifications are given for every jack in manufacturer's line. Forty pages and illustrated. Contains details and pictures of ratchet jacks, screw jacks, air-motor-operated jacks, and the improved automatic-lowering mechanism. Includes new 50-ton general-purpose screw jack of the inverted type. *The Duff-Norton Manufacturing Co.*

IT'S NEW ✓ CHECK IT

(23) DIESEL ENGINES covered by 64-page general catalog. Printed in four colors, this pocket-size catalog gives detailed descriptions of five series of engines covering power ranges from 84 to 275-hp. *Cummins Engine Co.*

IT'S NEW ✓ CHECK IT

(24) OIL TOOLS. New 20-page catalog features drilling tongs, elevators, elevator links, and connections. Stresses convenience, safety, and speed. Price list provided in table form. *Web Wilson Oil Tools.*

IT'S NEW ✓ CHECK IT

(25) STOCK FLANGE LIST. A 16-page bulletin illustrates and describes forged-steel flanges in boiler, marine, welding, high-hub, double-hub, tank, spud, offset, and horseshoe types; with sectional drawings, complete specifications, and list prices. Also included are tables showing American standards for threads, dimensions of wrought pipe, and working and bursting pressures of wrought-steel pipe. *Kropp Forge Co.*

IT'S NEW ✓ CHECK IT

(26) CHEMICAL RESISTANT LIQUID PLASTIC COATING. Two bulletins describe properties and characteristics of Fedelco liquid-plastic coating. High dielectric properties and nonchipping, nonchecking characteristics suggest this coating for oil-field equipment and pipe-line protection. Composed of inert plastic resins, coating provides a vapor pressure-proof membrane on the surface coated. *Federal Electric Co., Inc.*

IT'S NEW ✓ CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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NATURAL GAS

Texas Commission Issues New Carthage Gas Order

AUSTIN. — Temporarily enjoined by a court order from enforcing its original order, the Texas Railroad Commission last week issued a new proration schedule for Carthage gas field in Panola County.

The new order omits from the allowable schedule 21 unconnected wells and retains the previous proration formula. The commission's order shutting down some 30 wells in the field because of alleged overproduction was attacked in court by Chicago Corp., Clyde H. Alexander of Navarro County, Texas, and W. C. Alexander, of Shreveport, La., who contended market demand could not be met under the order and that scarcity of pipe caused the failure to connect all wells. State District Judge Roy Archer subsequently ruled the order invalid. The commission gave notice of appeal.

In a separate action, the commission granted Chicago Corp. permission to conduct 3-day tests on its newly completed processing plant in Carthage field. The plant is to take from 100,000,000 to 125,000,000 cu. ft. of gas daily from wells owned by Chicago Corp., Humble Oil & Refining Co., and R. E. Smith.

Government Retains Tax Policy on Unit Gas Plans

WASHINGTON.—The treasury department has abandoned its efforts to tax unit operations of gas fields as associations and at corporation rates, according to reports here.

The decision followed conferences between government officials and representatives of more than 20 interest-owners in the East Alice field in Texas who had been issued tax deficiency notices by the Commissioner of Internal Revenue. A decision holding there was no tax liability was entered in the Dallas tax court after the interest owners had appealed for a review of the action of the collector of internal revenue.

FPC Authority Questioned

Whether Federal Power Commission orders are inferior or superior to orders of state agencies may be decided soon by the U. S. Supreme Court. That body has agreed to review a lower court decision which held that Arkansas Power & Light Co. may maintain an action for a judgment to determine whether it is subject to accounting requirements of the FPC or conflicting requirements of the Arkansas regulatory commission. Both commissions, the power company says, claim sole right to prescribe official accounting methods.

I.N.G.A.A. to Close Oklahoma City Office

The Mid-Continent office of the Independent Natural Gas Association of America, located in Oklahoma City, will be closed December 1 and its activities transferred to the I.N.G.A.A.'s Washington office.

An announcement in the association's current news bulletin said the decision to close the Oklahoma City office was taken at the last meeting of the board of directors. Original purpose of the Oklahoma City office was to spearhead association membership drives, the bulletin said, and with present membership at about 1,600 and the work functioning well, as a result of the efforts of Charles L. Orr, the board felt the work could be consolidated with that carried on in Washington. Orr, who is association secretary, will resume his practice of law in Oklahoma City.

Hearing Set January 20 On T. G. & T. Rate Data

A hearing on information developed in a 2-year investigation of natural-gas sales rates of Tennessee Gas & Transmission Co. will be opened by the Federal Power Commission January 20 in Washington.

The investigation was instituted by the commission in 1944 to determine whether the Tennessee company's wholesale rates in interstate commerce were "unjust, unreasonable, unduly discriminatory, or preferential."

FPC Rate Order Upheld

A Federal Power Commission order requiring Cities Service Gas Co. to reduce its rates in 265 cities and towns in Oklahoma, Kansas, Missouri, and Nebraska was upheld last week when the Supreme Court refused to review a decision of the Tenth Circuit Court of Appeals. The commission had ordered Cities Service to cut rates so that revenues would be reduced at least $4,445,871 below the company's 1941 income.

In their request for a review, Cities Service attorneys had cited the Canadian River case to show that only a minority of four Supreme Court justices held in that opinion that the FPC possessed rate regulatory authority over "the production or gathering of natural gas."

They termed the circuit court "unmindful of or unimpressed with the fact" that the minority opinion was announced as "the prevailing view" in the Canadian River case.

FPC to Hear Requests For New Construction

A hearing on applications for new construction by three pipe-line companies will be conducted by the Federal Power Commission in Chicago December 10.

At the hearing the FPC will reopen its May proceedings in which the commission granted authorization for construction of new facilities to Natural Gas Pipe Line Co. of America, Texoma Natural Gas Co., and Chicago District Pipe Line Co.

Petitions for intervention in the new proceedings have been granted Western Railroads, Central Illinois Coal Operators Committee, Coal Traffic Bureau, Inc., and Northern Illinois Coal Trade Association.

Improvement Outlay For Gas, Electric Firms

Expenditures by gas and electric utilities in the United States for new equipment during the last quarter of this year are expected to reach $310,000,000, an increase of $30,000,000 over the third quarter and $130,000,000 above expenditures during first 3 months of 1946.

An estimate released by the Securities and Exchange Commission predicts manufacturing and mining industries will spend $1,790,000,000 for new equipment during the last quarter, compared with $1,850,000,000 during the third period and $1,210,000,000 in the first.

Carbon Plant Hearing Set

WICHITA, Kans.—The application of Tanker Gas, Inc., Minneapolis, Minn., for permission to build a carbon-black plant and related facilities near Reece, Kans., has been set for hearing November 26 in Topeka by the Kansas Corporation Commission. The plant is to use gas produced in the southwestern Greenwood County area.

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REFINING

U.S. Reports Show War Uses of Three Chemicals

WASHINGTON.—Wartime allocations of three industrial chemicals—ethyl alcohol, tricresyl phosphate, and amyl alcohol—are disclosed in newly released reports in the "Facts for Industry" series issued by the Bureau of the Census on the basis of records of the War Production Board.

Data given represents wartime controlled allocations and not total disappearance or consumption of the products. Report No. 27 of the series shows the synthetic rubber end-use took 51.2 per cent of the 475,008,000 gal. of industrial ethyl alcohol allocated from October 1, 1944, through June 30, 1945. Of the 28,154,000 lb. of tricresyl phosphate allocated in the war program from January 1, 1944, to June 30, 1945, 2.8 per cent was used in synthetic rubber, 2.5 per cent in lubricants, and 0.6 per cent in oil additives, according to Report No. 24. Petroleum refining was listed in Report No. 24 as taking 1 per cent of the 4,623,000 lb. of amyl alcohols allocated from April 1 to June 2, 1945.

Ashland Refinery Sets Eight-Month Safety Record

ASHLAND, Ky. — Eight months without a lost-time accident at its No. 1 refinery is reported by Ashland Oil & Refining Co. Roland Whealy, general superintendent, pointed out that up to October 14 the refinery had gone 257 days without a lost-time accident, while working almost 500,000 man-hours, achieving an accident index rate of 2.97 as compared with an average for the industry of 17.12.

Texas Co. to Install Jet Engine Testing Unit

NEW YORK.—A new testing unit for studying gas turbine and jet-engine operations will be installed soon by The Texas Co. in its research laboratory at Beacon, N. Y.

The test unit, to aid researchers in the study of combustion, fuel performance, and general operation of the engines, will be a single-combustion, chamber type, designed to simulate those flight conditions under which most problems are encountered.

Standard Oil Co. (N.J.) and Shell Oil Co., Inc., also are studying jet operation problems, Shell working on an army research contract in cooperation with General Electric Co. and Allison Engineering Co., and Jersey Standard working with Westinghouse Electric Corp., General Electric, and the Army and Navy. Socony-Vacuum Oil Co., Inc., at present is engaged in a study of gas-turbine fuels and the feasibility of manufacturing them economically.

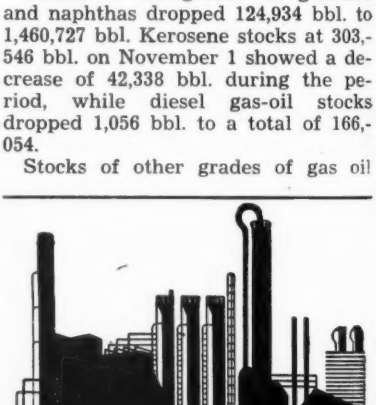
Slight Gain Shown in Gulf Coast Products Stocks

HOUSTON. — Total stocks of all products showed a slight increase during the last half of October in plants of member-company refineries of the Gulf Coast Refiners Association.

In its semimonthly report, the association showed 4,893,434 bbl. on hand November 1, as compared to 4,881,463 bbl. on October 15. A year ago total product stocks were 3,651,614 bbl.

Stocks of all grades of gasoline and naphthas dropped 124,934 bbl. to 1,460,727 bbl. Kerosene stocks at 303,546 bbl. on November 1 showed a decrease of 42,338 bbl. during the period, while diesel gas-oil stocks dropped 1,056 bbl. to a total of 166,054.

Stocks of other grades of gas oil



increased 97,259 bbl. to 2,011,746 bbl. No. 5 fuel oil increased 2,434 bbl. to 456,238 bbl., while Bunker C increased 85,777 bbl. to 599,123 bbl.

Crude runs to stills totaled 89,079 bbl. daily, an average of 61 per cent of the rated 145,000-bbl. a day operating capacity, against 65 per cent of capacity in first half of October.

Mid-Continent Bright Stock Production Gains

Bright-stock production by 12 Mid-Continent refineries totaled 247,178 bbl. in September, an increase of 10.8 per cent over August production and 12.7 per cent above the July figure.

Figures released by the Western Petroleum Refiners Association showed a 0.2 per cent gain of viscous-neutral production during September with 330,638 bbl. and the figure was also below July's production of 334,414 bbl.

Inventories of bright stocks rose from 121,405 bbl. August 31 to 143,818 bbl. September 30. Viscous-neutral inventories dropped to 234,662 bbl. from 248,872 bbl. during the same period.

Industry Gets Light Acid Container in New Plastic

A polyethylene compound plastic, reported to be impervious to acids and alkalis, is now reaching industry as paperweight containers for strong solutions.

Capable of being rolled into sheets as thin as 0.0015 in. and still keep a 2,000 psi. tensile strength, the new material, its producers say, is insoluble in concentrated acids, gasoline, and lubricating oils, carbon tetrachloride and other liquid hydrocarbons under normal conditions.

In addition to its industrial function as a container liner, the new material is expected to find a variety of other uses because of its strength and its odorless, tasteless, and nonsticky nature.

The product is manufactured by Visking Corp. and converted into various shapes and sizes for marketing by Traver Corp. under the name of Pearlon.

WAA to Offer Rubber, Related Plants in Sale

WASHINGTON.—About 60 plants producing raw materials, synthetic rubber and end products will be sold by the War Assets Administration through a new rubber plants and facilities branch headed by R. F. Dimmitt.

Most of the plants, valued at more than $600,000,000, still are in operation under supervision of the Office of Rubber Reserve and have not yet been declared surplus. Decision to sell the plants is in line with a recommendation of the Interagency Policy Committee representing interested government agencies.

Chemical Society to Aid Students From Abroad

WASHINGTON.—A gift of $25,000 to finance advanced study in this country by foreign chemists and chemical engineers has been made by the American Chemical Society. The Department of State, which announced the contribution, said it was the first known gift to the United Nations Educational, Scientific and Cultural Organization by a nongovernmental organization.

Lion Buys Tennessee Oil

Lion Oil Co. has purchased Tennessee Oil Co., Inc., of Dyersburg, Tenn., independent petroleum marketing concern of northwest Tennessee. The sale involves 5 bulk plants, 15 owned service stations, 7 leased stations, about 50 dealer accounts, and a large number of farm accounts, as well as complete water-terminal facilities on the Mississippi River at Heloise, Tenn., according to T. H. Barton, Lion president.

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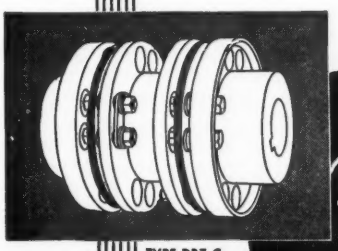

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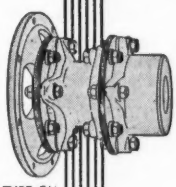

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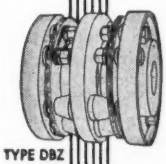

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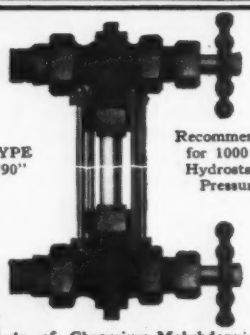

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PIPE LINES

Sunray To Build 8-Inch Allen-Drumright Line

SUNRAY OIL CORP. will construct 83 miles of 8-in. pipe line from its Allen, Okla., refinery to Drumright, Okla., as soon as equipment can be obtained, F. L. Martin, vice president in charge of refining, announced. Cost will be approximately $1,000,000.

The line will form a connection at Drumright with the Great Lakes Pipe Line Co.'s system, thereby facilitating deliveries of Sunray's finished gasolines and other light petroleum liquids to northern and northeastern sections of the country. Sunray will construct a pumping station at Allen, capable of handling a pipe-line throughput of about 20,000 bbl. of gasoline a day.

Routed through Bristow, the Sunray line will also receive gasolines produced at the Wilcox Oil Co.'s Bristow refinery, for delivery into the Great Lakes company's system. Wilcox will have half ownership of that portion of the line between Bristow and Drumright, a distance of about 16 miles. According to F. H. Dunn, president of Wilcox, his company will build a pump station at Bristow.

The pipe-line facilities will improve Sunray's marketing by providing more economical and better regulated transportation from the refinery at Allen, and will enable the company to get a better financial return on the products of that plant. The extensions of Great Lakes in the northern states in the past year make the new feeder facilities particularly valuable for Sunray and Wilcox.

Shipments tendered to the Great Lakes system will be 25,000-50,000 bbl. for Sunray and 25,000-30,000 bbl. for Wilcox. Specifications will be issued and contracts let for construction of the line within a week. It anticipated that the Allen-Drumright feeder line will be in operation April 1. Capacity of Sunray's Allen refinery is 10,000 bbl. daily; of Wilcox's Bristow refinery, 5,000 bbl. daily.

Line From Panhandle Field To Amarillo Announced

AMARILLO, Tex. — A 16-in. gas pipe line from the Panhandle field to Amarillo will be built by Amarillo Oil Co., it has been announced by R. E. Wertz, president. Pipe is expected to begin arriving in December, and it is planned to have the project completed by midsummer 1947.

Gas now is brought to Amarillo by two lines, one 12-in. and the other 8-in. It is planned to recondition these lines and keep them in service.

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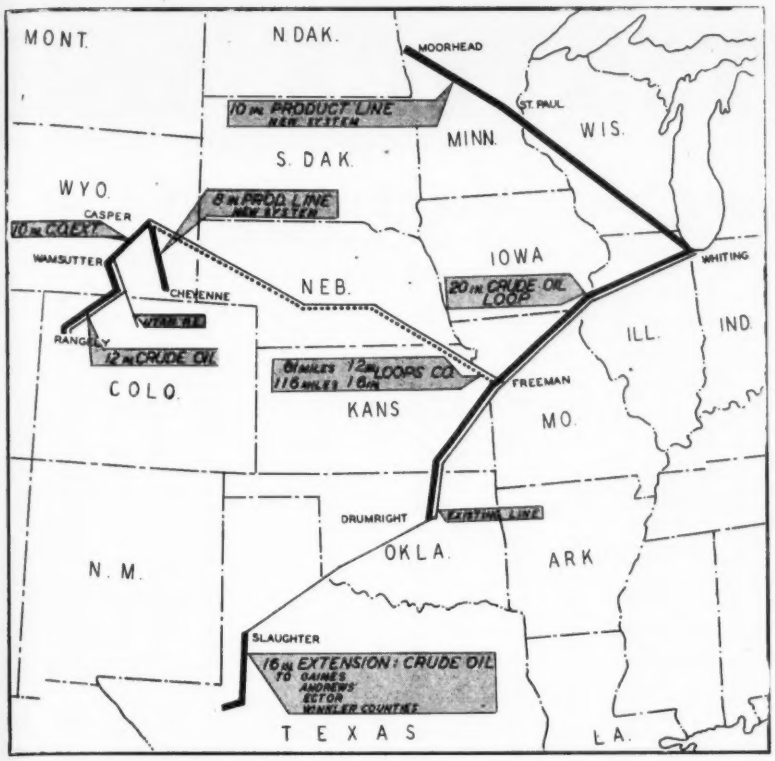

This map shows routes of projects included in Stanolind Pipe Line Co.'s expansion program: Drumright, Okla.-Whiting, Ind., 632-mi. 20-in. looping; West Texas, 75-mi., 16-in. extension; Rangely, Colo.-Wamsutter, Wyo., 12-in. line parallel to Utah Oil Refining Co. line, which will not be a loop but a separate Stanolind line; Casper, Wyo.-Freeman, Mo., 81-mi., 12-in. and 116-mi. 16-in. looping; Stanolind as agent of Standard Oil Co. (Ind.) is completing Whiting, Ind.-Moorhead, Minn., 10-in. gasoline line; Stanolind as agent for Wyco Pipe Line Co. Casper-Cheyenne, Wyo., will lay 8-in. products line. These projects were discussed in an article in The Oil and Gas Journal, page 158, November 16

Pipe Liners Club Elects Officers

A SUCCESSFUL banquet was held on the occasion of the annual meeting of the Pipe Liners Club, November 11 in Chicago, which was attended by more than 200 members. Burt E. Hull, president, Texas Pipe Line Co. has been president of the organization during the past year.

New officers elected are: W. R. Finney, pipe-line coordinator, Standard Oil Co. (N.J.), president; D. D. Irwin, president, Pure Transportation Co., vice president; N. C. McGowen, president, United Gas Pipe Line Co., vice president. In addition to Hull, Finney, and McGowen, the board of governors includes B. R. Bay, president, Northern Natural Gas Co. The membership committee consists of W. C. Kinsolving, chief engineer, Sun Pipe Line Co.; J. H. Peper, vice president, Buckeye Pipe Line Co.; D. F. Leary, (Petroleum Advisers) Cities Service Oil Co. Oliver C. Klinger is secretary and treasurer of the club.

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MODEL 48
BUCKEYE TRACTION DITCHER COMPANY
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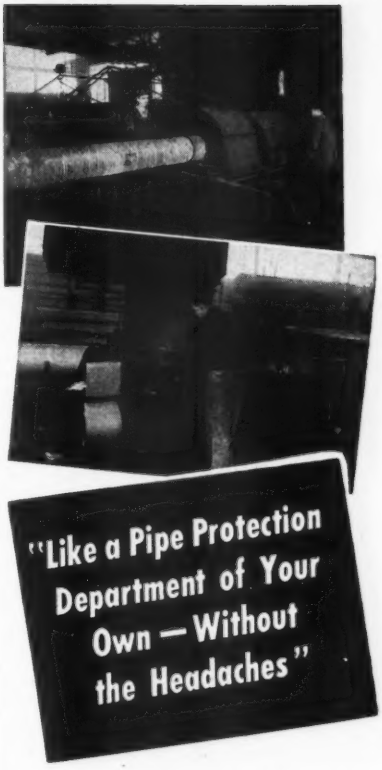
Standards Bureau Issues Valve Recommendation

WASHINGTON. — The standing committee in charge of reviewing and revising Simplified Practice Recommendation R184-42, Iron Body Valves, has approved a revision of the recommendation, and the division of simplified practice of the U. S. Bureau of Standards has mailed copies to all interests for approval or comment.



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Find out today how much *more* Pipe Line Service gives you for your pipe protection dollar.

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Corpus Christi, Texas • Harvey, Louisiana

STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED NOVEMBER 16, 1946

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1946				
	Comp.	Oil	Gas	Dry	Footage	1946	1945	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	32	16	0	*16	41,932	1,395	1,299	0	0	0	0	0	0	0	0	0	0
Pennsylvania	79	40	9	†30	120,316	3,502	3,581	0	0	0	0	0	0	0	0	0	0
West Virginia	20	2	13	5	55,916	661	709	0	0	0	0	0	0	0	0	0	0
Ohio	29	4	14	11	86,203	1,115	869	0	0	0	1	1	3	0	13	36	52
Indiana	7	3	0	4	13,746	325	172	0	0	0	0	0	4	0	0	16	20
Kentucky	8	1	3	4	20,838	414	499	0	0	0	1	1	7	0	0	35	42
Illinois	43	26	0	17	106,911	2,039	1,597	0	0	0	9	9	52	0	1	405	458
Michigan	15	2	4	9	31,237	709	671	0	0	1	7	8	20	0	8	229	257
Kansas	52	20	19	13	157,040	1,755	1,534	0	0	1	6	7	27	0	2	229	258
Neb., Mo., Iowa	0	0	0	0	0	18	20	0	0	0	0	0	0	0	0	13	13
Oklahoma	102	72	10	‡20	280,614	2,612	2,114	3	0	0	13	16	84	0	36	332	452
Texas	143	83	12	48	619,530	6,895	6,322	1	0	1	24	26	192	26	32	1,147	1,397
North Central	39	20	2	17	100,104	2,426	1,921	0	0	0	7	7	66	6	4	469	539
West	47	33	4	10	193,449	1,540	1,547	0	0	0	5	5	46	0	1	154	201
Panhandle	7	5	2	0	21,944	280	493	0	0	0	0	0	0	0	0	5	5
Eastern	8	1	3	4	41,224	623	329	0	0	0	0	0	44	22	13	231	310
Gulf Coast	35	24	1	10	233,706	1,514	1,474	1	0	1	7	9	17	2	5	91	115
Southwest	7	0	0	7	29,103	512	558	0	0	0	5	5	19	2	9	197	227
Louisiana	40	24	4	12	213,475	1,228	956	0	0	0	3	3	45	13	7	164	229
Northern	26	17	4	5	99,488	698	402	0	0	0	2	2	9	0	2	90	101
Southern	14	7	0	7	113,987	530	554	0	0	0	1	1	36	13	5	74	128
Arkansas	7	4	0	3	19,215	160	160	0	0	0	2	2	7	0	0	34	41
Mississippi	10	6	0	4	80,113	221	324	0	0	0	2	2	1	0	1	61	63
Southeastern States	1	0	0	1	5,286	38	53	0	0	0	1	1	1	0	0	31	32
Montana	6	2	4	0	12,399	281	282	0	0	2	0	2	10	0	4	28	42
Wyoming	4	2	1	1	22,865	148	195	0	0	0	1	1	11	0	3	33	47
Colorado-Utah	4	4	0	0	25,836	141	50	0	0	0	0	0	4	0	0	16	20
New Mexico	9	6	0	3	38,915	355	373	0	0	0	1	1	4	0	0	35	39
California	19	14	1	4	114,683	1,336	1,989	2	0	0	4	6	27	0	5	199	231
Total United States	630	331	94	205	2,067,069	25,348	23,759	6	0	5	75	86	499	39	112	3,043	3,693
Total previous week	594	303	58	233	1,932,927	24,718	23,181	12	2	4	89	107	493	39	107	2,968	3,607
Total Nov. 17, 1945	578	304	91	183	2,034,341			7	1	2	61	71	466	21	118	3,029	3,634

Service wells included: *16, †29, ‡3.

MARKET QUOTATIONS

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Tex.*
18-18.9	$1.17			
19-19.9	1.21		$1.41	
20-20.9	1.24	$1.20	1.43	1.07
21-21.9	1.28	1.22	1.45	1.09
22-22.9	1.32	1.24	1.47	1.11
23-23.9	1.35	1.26	1.49	1.13
24-24.9	1.39	1.28	1.51	1.15
25-25.9	1.43	1.30	1.53	1.17
26-26.9	1.46	1.32	1.55	1.19
27-27.9	1.50	1.34	1.57	1.21
28-28.9	1.54	1.36	1.59	1.23
29-29.9	1.57	1.38	1.61	1.25
30-30.9	1.61	1.40	1.63	1.27
31-31.9		1.42	1.65	1.29
32-32.9		1.44	1.67	1.31
33-33.9		1.46	1.69	1.33
34-34.9		1.48	1.71	1.35
35-35.9		1.50	1.73	1.37
36-36.9		1.52	1.75	1.39
37-37.9		1.54	1.77	1.41
38-38.9		1.56	1.79	1.43
39-39.9		1.58	1.81	1.45
40 and above		1.60	1.83	1.47

*Includes Lea County, New Mexico.

(Quotations shown here are f.o.b plant in tank cars and in cents per gal. as of last Monday.

REFINERY GASOLINE

Octane (A.S.T.M.)	78-78½†	73-75
Mid-Continent*	7.375-7.625	6.625-7.000
Tex. Gulf Coast	7.250	6.500-6.750
New York Harbor	11.9	10.4
California		6.250-6.750

*Basic Oklahoma Group 3. †1939 C.F.R. (research method).

NATURAL GASOLINE

Grades—	26-70	18-55
Oklahoma (Group 3)	4.750	5.700
N. Texas (f.o.b. plant)	4.250	5.100
N. Louisiana (f.o.b. plant)	4.500	5.400
California (averages)	5.500	6.250

CRUDE-OIL PRICES

Representative posted schedules per bbl.

East Texas	$1.60
Kettleman Hills, California*	1.69
Beauregard Parish	1.55
Illinois Basin	1.72
Pecos County, Texas	1.30
Bradford, Pennsylvania	3.41
Eastern Ill., and Western Ind.	1.57

Note: Crude prices exclusive of subsidy.

A.P.I. REFINERY REPORT

Week ended November 9, 1946

(Figures in thousands of barrels)

	Daily crude runs to stills	Stocks: Gasoline	Distillate	Residual
East Coast	720	19,935	24,884	12,550
Appalachian	152	3,173	754	654
Ill., Ind., Ky.	798	15,122	8,804	5,715
Okla., Kan., Mo.	376	8,363	3,511	1,339
Inland Texas	227	3,048	619	862
Tex. Gulf Cst.	1,146	13,779	11,221	7,598
La. Gulf Cst.	326	4,190	3,927	2,321
No. La., Ark.	64	1,752	493	201
Rocky Mtn.	125	1,499	587	683
California	780	16,102	12,486	29,417
Total 11- 9-46	4,714	86,963	67,286	61,340
Total 11- 2-46	4,769	85,930	65,943	61,636
Total 11-10-45	4,696	78,978	46,143	46,193

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended—	Bbl. of crude*
November 9, 1946	221,302,000
November 2, 1946	221,870,000
November 10, 1945	219,999,000

*Excludes unrefinable Calif. stocks.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	Nov. 16 crude oil	B. of M. Nov. demand	Nov. 9 crude oil
Alabama	1,100	1,200	1,000
Arkansas	78,500	77,000	78,650
California	871,000	850,000	869,500
Colorado	37,020	32,000	38,310
Eastern	64,800	64,200	70,500
Florida		200	
Illinois	204,000	212,000	206,950
Indiana	19,350	19,000	19,400
Kansas	269,900	263,000	267,450
Kentucky	29,950	29,000	30,100
Louisiana	407,000	382,000	406,750
North Louisiana	97,650	.....	97,400
South Louisiana	309,350	.....	309,350
Michigan	44,515	46,000	45,000
Mississippi	78,350	60,000	77,100
Montana	23,770	24,000	24,080
Nebraska	750	800	750
New Mexico	100,500	99,000	100,500
Oklahoma	365,200	383,000	363,250
Texas	2,096,750	2,090,000	2,102,250
District 1 (Southwest)	19,000	.....	19,000
District 2 (Southwest)	147,200	.....	147,200
District 4 (Southwest)	226,300	.....	226,300
District 3 (Gulf Coast)	464,300	.....	464,300
District 5 (Eastern)	36,850	.....	36,850
District 6 (Eastern)	105,100	.....	105,100
East Texas field	324,000	.....	324,000
District 7C (West)	29,500	.....	29,500
District 8 (West)	507,250	.....	512,750
District 7B (W. Central)	35,300	.....	35,300
District 9 (N. Central)	121,400	.....	121,400
District 10 (Panhandle)	80,550	.....	80,550
Wyoming	103,100	97,000	104,320
Miscellaneous other	.....	600	.....
Total United States	*4,795,555	4,730,000	4,805,860
Change from prev. wk., down	10,305		

Total production January 1-November 16..... †1,520,228,189 bbl.
Same period last year (crude, plus condensate) 1,502,787,425 bbl.
*Not incl. 23,350 bbl. condensate. †Incl. 7,694,350 bbl. condensate.

CRUDE-OIL STOCKS 221,302,000 bbl. as of November 9—down 568,000 bbl. One year ago 219,999,000 bbl.

GASOLINE STOCKS 86,963,000 bbl. as of November 9—up 1,033,000 bbl. One year ago 78,978,000 bbl.

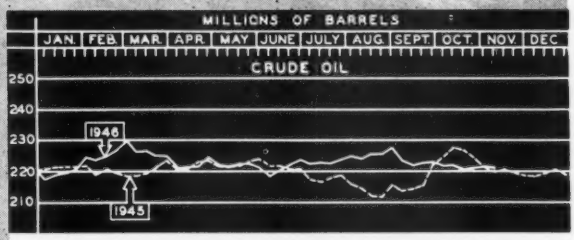
RESIDUAL FUEL-OIL STOCKS 61,340,000 bbl. as of November 9—down 296,000 bbl. One year ago 46,193,000 bbl.

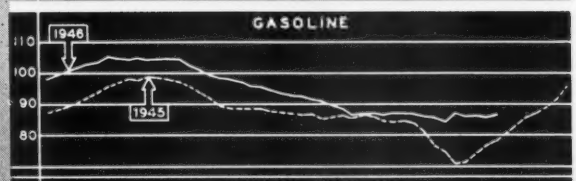
GAS OIL AND DISTILLATE STOCKS 67,286,000 bbl. as of November 9—up 1,343,000 bbl. One year ago 46,143,000 bbl.

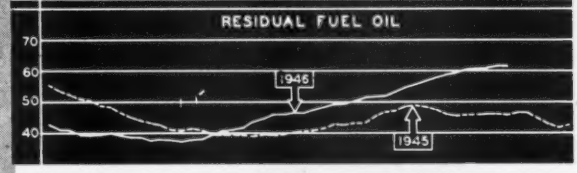
CRUDE-OIL PRODUCTION 4,795,555 bbl. as of November 16—down 10,305 bbl. One year ago 4,467,500 bbl.

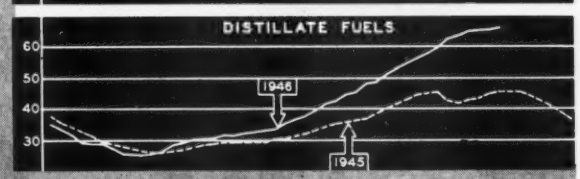
REFINERY RUNS 4,714,000 bbl. daily week ended November 9—down 55,000 bbl. One year ago 4,696,000 bbl.

OIL STOCKS IN THE UNITED STATES

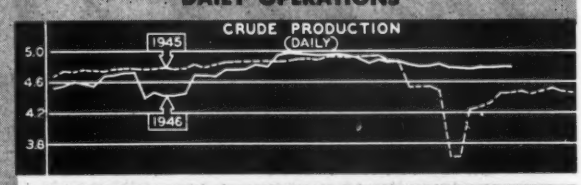


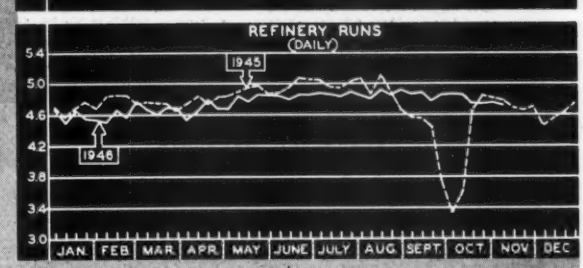




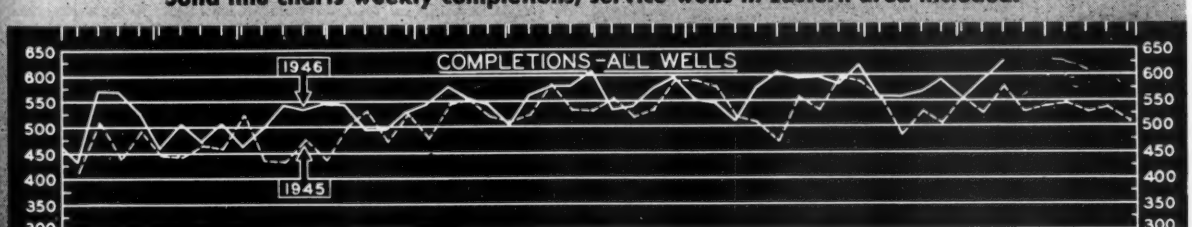


DAILY OPERATIONS





Solid line charts weekly completions, service wells in Eastern area included.



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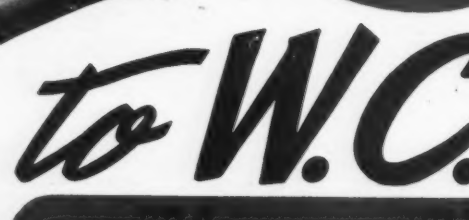

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Exploration and Drilling

Research and the A.P.I.

AMONG the numerous committee sessions at the annual A.P.I. meetings there is always one of the Advisory Committee on Fundamental Research on Occurrence and Recovery of Petroleum, and one of the complementary Advisory Committee on Fundamental Research on the Composition and Properties of Petroleum. These two committees represent unusual activities for a trade association, because they deal in what is sometimes called "pure or fundamental research" rather than "applied research."

These committees tend to avoid publicity, because their objectives are long range, and as in all fundamental research, no one knows exactly what the end result will be. There is an old saying among the experts that fundamental research always turns up some very important discoveries along entirely unexpected lines. It is also well known that nowadays many applied-research projects sooner or later have to go back and do a little fundamental research to whip some angle of the practical problem. Here, too, in the course of solving a strictly practical problem, they often develop some entirely unexpected byproduct results.

• An example of this latter type is showing up in the results of the work of the Penn Grade crude organization. To solve the practical problem of why water input wells plug up, some fundamental work on clays became necessary. The answers originally sought are being found, but in addition as byproducts, are potential applications in exploration, drilling, completion, and electric-logging practices, as well as to reservoir engineering. This may lead to wider financial support for this group's work on the grounds that it has become important to many more people than the Penn Grade producers.

It is reported that the A.P.I. committee was presented with outlines of some geological research projects that had been worked up to the blueprint stage by the research committee of the American Association of Petroleum Geologists. This latter committee, after nearly 2 years of hard work, is gradually bringing system and coordination into the field of petroleum-geology research problems. These problems are so numerous and their interrelationships so complex, that it has been difficult to get them systematically organized for a concerted attack. The work of the A.A.P.G. committee in coordinating, organizing, and blueprinting these problems into projects, is now giving something tangible to those responsible for disbursing research funds.

Then there is the old development in connection with bacteriology. The projects on fundamental research into the origin of oil have all recognized that the functioning of anerobic bacteria is very important. Much work has been done in this connection, but the road to the ultimate answers is still long and hard. In the meantime, however, it is known that some refiners have developed interest in bacteriology, as a field of potential usefulness in solving some of their problems. There are indications that some hard-headed refiners are financing private research along this line.

MICHIGAN

Small Gas Discovery in Ottawa County Completed

SAGINAW.—Michigan oil operators drew a series of blanks in the week's operations, the record of 15 completions showing 9 dry holes, 2 producers—one for 5 bbl., the other for 25—and four small gas wells. Of the completions, eight were wildcats, all dry holes, except for a shallow natural gas well that was rated at 53,000 cu. ft. in Zeeland Township, Ottawa County. The 5-bbl. well is in Chippewa Township, Isabella County, producing from 3,596 ft. in a well plugged back from 4,805 ft., and the other is in Bangor of Van Buren.

Of the 23 new drilling permits announced by the state conservation department, 12 went to Consumers Power Co. for operations in Winterfield Township, Clare County, for natural gas development. Three other locations are in Roscommon County, two in Allegan, one each in Montclam, Arenac, Gladwin, Ottawa, Livingston and Lake.

MICHIGAN SUCCESSFUL WILDCAT

Ottawa County, Zeeland Township: Clawson Development Co. 1 Gerrit and Bertha Ross, C NE NE 14-5n-14w, gas well, 53,000 cu. ft., TD 990 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Casco Township: Arthur J. Boeve 1 John and Mary Caopon, NE SE NW 3-1n-16w, dry, TD 1,212 ft.

Cheshire Township: Circle Drilling Co. 1 Alice Gile, SW SW SW 9-1n-14w, dry, TD 1,338 ft.

Martin Township: Don L. Lindsley 1 M. D. Hardin estate, SW SE SW 7-2n-11w, dry, TD 1,645 ft.

Bay County, Pinconning Township: Ward Oil Co.-Rowmor Corp.-Ervin Major 1 Frank Bartman, NE NE NE 35-17n-4e, dry, TD 3,094 ft.

Eaton County, Eaton Rapids Township: Fisher-McCall Oil & Gas Co., Inc., 1 Martin Zuber, SE NW NW 8-2n-3w, dry, TD 2,507 ft.

Mecosta County, Big Rapids Township: Frank Rand and John Neyer 1 Dr. F. E. Curtis et al, SE SE NW 27-15n-10w, dry, TD 3,635 ft.

Colfax Township: Charles W. Teater 1 Albert Lucht, SW NW SE 8-15n-9w, dry, TD 3,637 ft.

Newaygo County, Denver Township: E. L. Bourret 1 Edward L. Conway, NW NW NW 15-14n-14w, dry, TD 2,250 ft.

APPALACHIAN FIELD

Kanawha County Gets More Gas Production

PITTSBURGH.—In Elk district, Kanawha County, West Virginia, Harold H. Neff, agent, completed a test, S. A. Gregg, in the Oriskany sand with a final open flow of 9,811,000 cu. ft. of gas, natural. Surface elevation was 855 ft., Corniferous lime 5,033 ft., Oriskany 5,145 ft., gas 5,161 ft., rock pressure 860 lb. 48 hours, total depth 5,180 ft. Here Columbian Carbon Co. completed 887 W. P. Morris with a gage of 1,929,000 cu. ft. of gas after shot. Surface elevation was 721 ft., Corniferous lime 4,905 ft., Oriskany 5,017 ft., shot 5,017-577 ft., rock pressure 1,410 lb., 24 hours, total depth 5,087 ft.

In Big Sandy district, Kanawha County, Falling Rock Producing Co. completed No. 23 fee good for 3,500,000 cu. ft. of gas, natural, only 2 ft. in the Oriskany sand. Surface elevation was 806 ft., Corniferous lime 5,037 ft., Oriskany 5,215 ft., total depth 5,217 ft. In Elk district, this company topped the Corniferous lime at 5,253 ft. from a surface elevation of 1,085 ft. in No. 3 Fred J. Thabet.

In Kermit district, Mingo County, E. C. Ware completed a test, with total depth 1,491 ft.

New locations totaled 17 of which none were wildcats. They were in Sherman district, Boone County; Sheridan and Sherman districts, Calhoun County; DeKalb district, Gilmer County; Cabin Creek and Elk districts, Kanawha County; Kermit district, Mingo County; Curry and Teays Valley districts, Putnam County; Grant district, Ritchie County; Smithfield district, Roane County; Buckhannon district, Upshur County; Burning Springs district, Wirt County, and Clear Fork district, Wyoming County.

New locations in Southwest Pennsylvania totaled four. They were in Porter Township, Clarion County; Greene Township, Greene County; Beaver Township, Jerrerson County, and Amwell Township, Washington County. In addition, in Erie County in Northwest Pennsylvania, Pennsylvania Gas Co. has a location for a test on the C. J. Follette farm in Wayne Township,

and Appalachian Development Co., on the Carl W. Held farm in Summit Township.

SOUTHWEST TEXAS

San Patricio County Test May Open New Oil Field

CORPUS CHRISTI.—A new oil field in San Patricio County, just north of the Nueces County line and about 6 miles northwest of the Riverside field, was indicated in drill-stem tests run in Hewit & Dougherty 1 Lois Thornton, wildcat test about 2 miles northwest of the San Patricio townsite. On drill-stem test at 5,395-5,400 ft., with ¼-in. chokes top and bottom, the well developed 350 lb. working pressure in 15 minutes and recovered 55 ft. of high-gravity oil; test at 5,441-50 ft. recovered 285 ft. of pipe-line oil. Operators are now preparing to drill ahead.

In the Southwest Texas area keen interest is centered on the structure known as the Vicksburg Flexure, extending southwest from a little above the northern tip of the Agua Dulce field in northern Nueces County, down through the Stratton field in Nueces and Kleberg, the Monte Negra and Borregas fields in Kleberg, the Seeligson, Tijerina and Canales fields in Kleberg and Jim Wells and the Brooks field in Jim Wells and Brooks counties, a distance of some 60 miles, the width varying up to 10 miles. This area has been developed as a number of separate fields. Now it is conceded to be the largest distillate reservoir and the second largest oil and gas reservoir in the history of the United States. East Texas is rated first in oil and gas, but East Texas has but one pay zone, whereas the South Texas area has over 45 pay zones or reservoirs.

In the LaGloria field of Jim Wells County, Magnolia Petroleum Co. 1 Sharp Estate, has been completed flowing 100 bbl. of condensate and an estimated 4,400,000 cu. ft. of gas per day through a 3/8-in. choke, tuging pressure 1,800 lb., casing sealed. Total depth is 7,700 ft., with production through perforations at 7,170-85 ft.

There were 45 new locations reported this week for the Southwest Texas area, 15 being wildcats, 3 in Duval, 2 each in Atascosa and Zapata, and 1 each in Bee, Cameron, Jim Wells, Karnes, Kleberg, McMullen, Nueces, and Willacy counties. The Tom O'Connor field in Refugio County received 14 new starts. The 28 completions included 16 oil wells, 1 gas discovery in Willacy County, and 11 dry holes, of which 9 are wildcats, 2 each in Duval and Webb counties, and 1 each in Jim Wells, Live Oak, Medina, San Patricio and Victoria counties.

SOUTHWEST TEXAS SUCCESSFUL WILDCAT

Willacy County: New gas pool—Magnolia 2 F. Armendaiz, in San Juan de Carricitos grant, 9 mi. NE of San Dominio, 6½ mi. SE of Willamar field, TD 9,70[illegible] ft., top pay 8,585 ft., perf. 8,585-8,600 ft., IP 13,000,000 cu. ft. gas per day open flow, with condensate, no gage, shut-in pressure 3,280 lb., no water.

SOUTHWEST TEXAS WILDCAT FAILURES

Duval County: Tom Graham et al 1 J. T. Dinn, Sur. 666, 15 mi. NE of Bruni, and 1 mi. N of Dinn field, dry, TD 6,508 ft.

Magnolia 1 E. V. Spence, E. J. Rouby Sur. 252, 9 mi. SW of San Diego, 2 mi. NW of Tesoro field, dry, TD 5,207 ft.

Jim Wells County: Bridwell Oil Co. 1 R. C. Miller, in Benito Lopez de Jean grant, 2 mi. SE of Orange Grove, dry, TD 5,803 ft.

Live Oak County: Ray R. Clark 1 C. S. and W. H. Herring, Lot 1240, in Simmons Farm Lots subd., 3 mi. NE of Simmons City, dry, TD 2,065 ft.

Medina County: Chas. H. Wagener 1 Dock Griesenbeck, in Chicon Lake area, Lot 14-A, Blk. 5, Sur. 1, Medina Irrigated Farms, dry, TD 1,169 ft.

San Patricio County: H. R. Smith and Dan Auld and Atlantic Refg. 1 Sevier, Sec. 6, 2nd addn. Taft Farm Lands, G. T. Tabor Sur., dry, TD 11,023 ft.

Victoria County: Floyd L. Karsten 1 Luling Foundation, in J. S. Hendershot Sur., ¾ mi. SW of East Telferner field, dry, TD 4,457 ft.

Webb County: Chas. H. Houston and Joe S. Mellard 1 D. D. Hachar, Porcion 48, 10 mi. S of Laredo, dry, TD 5,205 ft.

The Texas Co. 1 Grant Adami, in Wm. Adami Sur. 10, 16 mi. NW of Freer, dry, TD 1,510 ft.

PERMIAN BASIN

Block 12 Producer Ready To Complete at 8,710 Ft.

MIDLAND.—Atlantic Refining Co.'s 1-E Texu, Section 18, University Lands, first Devonian producer in Block 12 pool, was ready to complete at plugged-back total depth of 8,710 ft., where it swabbed 12 bbl. of oil in 2 hours and 10 minutes. Location is on the west side of the field. Atlantic's 2-A Texu, Section 9, bottomed at 7,280 ft. in lime, tested 5 bbl. of fluid, mostly oil, in 1 hour and 55 minutes. On last report it was cleaning out to complete. Atlantic's 1-G Texu, Section 21, swabbed 5 bbl. of oil in 2 hours and was ready to complete.

In Crane County, Phillips Petroleum Co. 1-L University, in Section 33 of Block 31 field, was a dual completion in the Devonian and Ellenburger. Perforations at 8,600-8,838 ft., in the Devonian, flowed 374 bbl. of oil through 7/32-in. choke in 24 hours, and production from the Ellenburger at 10,365-10,440 ft., total depth, was 325 bbl. of oil in 24 hours.

In Tom Green County, 10 miles southeast of San Angelo, Palmer Oil Corp. et al have staked location for an Ellenburger wildcat. It will be the 1 W. N. Oates, Section 52, SP Survey, and about 2¼ miles southwest of The Texas Co.'s 5,955-ft. dry test drilled a year ago. The 5,500-ft. venture is on a block of 9,000 acres assembled by W. L. Douthit and H. B. Dickenson, of Midland, Tex., and turned over to A. M. Lacey and W. U. Paul, partners in the deal.

In the northwest flank of TXL field in Ector County, The Texas Co.'s 6 E. R. Thomas was completed for a natural daily potential of 2,024 bbl. of 45°-gravity oil, indicating an even farther west extension of Ellenburger production in that sector. Flow was through ½-in. tubing choke from pay topped at 9,770 ft. Total depth is 9,840 ft. Gas-oil ratio was 1,352:1. In the north central section of the field, Shell and Cities Service Oil Co.'s 4-D TXL made potential of 51 bbl. of oil in the Devonian at 7,895-8,021 ft. It did not test the Ellenburger. South of the field, American Republics 1 TXL, an extension test, reached 10,343 ft. in lime and shale. It logged the McKee section of the Simpson at 10,210 ft., or 7,157 ft. subsea.

In Midland County, southeast of Midland, Humble Oil & Refining Co. has staked location for a 12,500-ft. rotary wildcat. The operation will be the 1 Mabel M. Floyd in Section 16, T&P Survey. Location is 4½ miles south and 2½ miles east of the new Midland Strawn field, opened by Humble's 1 Buchanan, which produces from 10,370-90 ft. It is 2½ miles south and 2½ miles east of Humble's 1 Mary E. Turner, which last week was drilling below 11,226 ft.

Stanolind Oil & Gas Co.'s 1-GG University, northeastern Crockett County wildcat, continued testing the Ellenburger through casing perforations at 8,298-8,371 ft. It was swabbing load oil in an effort to start a flow.

In Schleicher County, L. W. Elliott's 1 Virgil G. Tisdale, wildcat test 3½ miles northwest of production in the Page field, ran casing to bottom, 2,774 ft., to test two zones from which oil-cut mud was recovered on drill-stem tests. The section was believed to be the Wichita-Albany at 2,709-26 ft., and 2,750-69 ft. On a 22-minute test, 3 stands of oil-cut mud were recovered, and bottom-hole pressure gaged 1,000 lb. in 10 minutes. There was some gas but no water. Electric log ran to 2,669 ft. confirmed the two porous zones. Top of the lime was found near 2,200 ft., with derrick-floor elevation 2,424 ft. The zones from which the oil showings were recovered were thought to correlate with a formation in which oil shows were found in J. D. Wesner's 1 W. R. Nicks, 2½ miles to the northwest, at around 4,000 ft. The 1 Tisdale is on a 3,120-acre block leased by W. M. Holland and R. Grossenbacher of San Angelo, who have an interest in the well. Rhodes Drilling Co., contractor, will carry the test to 6,000 ft. if commercial production is not developed at the present depth.

WEST TEXAS WILDCAT FAILURES

Andrews County: White Eagle Oil Co. 1 University, Sec. 5, Blk. 14, University Lands, 1 mi. W of Shafter Lake field, elevation 3,195 ft., dry, TD 2,992 ft., estimated 1,500,000 cu. ft. gas at 2,993 ft.

Bailey County: John W. Naylor and Bruce Sullivan 1 Maple Wilson, Sec. 12, Childress CSL, 4 mi. W of Enoches, elevation 3,864 ft., dry, TD 6,003 ft., electric log tops: Ellenburger 3,864 ft., San Andrews 3,320 ft., Clear Fork 5,230 ft.

Upton County: C. A. Jones 1 Good-Neil, Sec. 23, N edge Rankin townsite, elevation 2,562 ft., dry, TD 4,028 ft., San Andres 3,885 ft.

Ward County: T. F. Slack and Al Parker 1 G. B. McCamey, Sec. 149, H&TC Sur., 1 mi. N of Quito, elevation 2,708 ft., dry, TD 5,135 ft., Delaware lime 5,066 ft., Delaware sand 5,100 ft.

Winkler County: Dunigan Bros. & Brahaney 1 Sealy-Smith-F, Sec. 86, G&MM-B&A Sur., 2 mi. E Sealy-Smith, elev. 2,684 ft., dry, TD 6,570 ft., Glorietta 4,880 ft., Tubb 5,970 ft., no shows.

SOUTHEAST NEW MEXICO

HOBBS.—Plans are under way by Martin Yates, Jr., Honolulu Oil Corp., and others to extend the depth of their 1 Mullis unit, wildcat in south central Chaves County.

It was disclosed that unless production is obtained at a shallower level, they will deepen the unit from 5,675 to 10,000 ft. The test, SE SW 21-15s-29e, north of the Eddy County line, was drilled more than a year ago and was temporarily abandoned at 5,675 ft., having had no oil or gas shows.

George P. Livermore, Inc., of Lubbock, was awarded the contract for the deepening.

The original operators and owners of a spread of 6,000 acres surrounding 1 Mullis unit were Continental, Yates, and J. R. Miller. Hnolulu recently acquired a half interest in the block which included the wildcat. Continental retains a quarter interest and Yates and Miller hold the remaining quarter jointly.

Standard Oil Co. of Texas' recompletion of 1-29 State will probably result in longer life for the Hobbs field in eastern Lea County. The recompletion was for 200 bbl. of oil in 8½ hours through casing perforations at 3,190-3,241 ft.

The California Co., predecessor to Standard of Texas, completed the well in 1930 for 55 bbl. of oil in 2½ hours, bottomed at 4,191 ft. The oil was said to have been virtually exhausted when the well was plugged back to the upper pay, identified as the Bowers sand.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Eddy County: Willis F. Lakey 1 M. T. Anderson, Sec. 31-19s-28e, dry, TD 1,074 ft. in lime.

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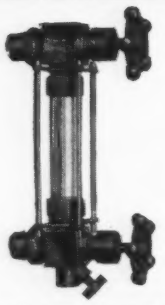

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SOUTH LOUISIANA

New Cockfield Sand Area Found in Beauregard Parish

NEW ORLEANS.—A new Cockfield producing area for the South Louisiana district is indicated at Barnsdall Oil Co. 1 Long Bell Lumber Co., Beauregard Parish, 4 miles north of production in the Gordon field, 1-6s-10w. The well is waiting on cement after running 7-in. pipe to a total depth of 8,430 ft. On a drill-stem test, previous to pipe setting, at 8,262 ft. a recovery of 20 stands of 46°-gravity pipe-line oil, no water, was made in 20 minues, with good working pressures.

A new deep gas-condensate producing sand for Lake Barre field, Terrebonne Parish, has been brought in by The Texas Co. 45 State-Lake Barre on Lease 199, 19-21s-20e. Drilled to a total depth of 14,021 ft., this well flowed an initial production of 32 bbl. of 50°-gravity condensate through an 8/64-in. choke. Flowing pressure on the tubing was 3,500 lb., and gas-condensate ratio 32,000 to 1. Production is through 54 perforations at 11,915-24 ft., with gas sands being picked up from 11,900-30 ft. Sandy shale with broken streaks of sand showing oil was picked up from 12,215-290 ft.

The California Co. 1 Louisiana Citrus Lands, Inc., 1,400 ft. south of the 4 Brady Unit 4, gas-condensate discovery for the Alliance field, Plaquemines Parish, has been completed as an oil well. Drilled to a total depth of 9,800 ft., the well flowed at the rate of 207 bbl. of pipe-line oil, 38°-gravity, daily through ¼-in. and ⅛-in. chokes with 1,700 lb. pressure at the top, gas ratio 800 to 1. Tubing was run for a production test, but the well sanded up. Tubing is now being pulled for a clean out, after which another flow test will be made.

There were 17 new locations reported this week, 4 being wildcats, 1 each in Iberville, Rapides, St. Landry and Terrebonne parishes. The greatest activity for new work was shown in Terrebonne Parish where six new starts are reported. The 14 completions included 7 oil wells in proven area, and 7 dry holes, 1 of which was a wildcat in Tangipahoa Parish.

SOUTH LOUISIANA WILDCAT FAILURE

Tangipahoa Parish: Lion Chemical Corp. 1 M. L. Varnado, 38-2s-8e, dry, top Wilcox 5,930 ft., TD 9,027 ft.

TEXAS GULF COAST

New Deep Condensate Sand Found in Altair Field

HOUSTON.—Superior Oil Co. 4-A Myra S. Pryor, new deep sand producer at Altair in Colorado County, has been given a potential flow test. It gaged 117 bbl. of 50°-gravity condensate daily along with 4,600,000 cu. ft. of gas, ratio approximately 40,000 to 1, through a 16/64-in. choke with 3,050 lb. flowing pressure on the tubing, shut-in pressure being 3,600 lb. Total depth is 10,366 ft., and pipe is perforated with 72 holes from 10,174-92 ft. for completion.

Pan American Production Co. abandoned its discovery well of the Liverpool field, Brazoria County. It is the 1 Callihan Unit, between production in the Rowan and Chocolate Bayou fields, in Angier-Hall-Bradley Survey, Abstract 6, in Lot 2 of the Callihan subdivision of Tract 9. The discovery was brought in last August for a gage of 331 bbl. of 40°-gravity oil daily through a 12/64-in. choke. It was completed through perforations at 8,757-62 ft. but gradually went to 100 per cent salt water. Total depth is 12,204 ft.

Floyd L. Karsten 1 J. R. Braden, an old abandoned hole north of present production in the Daboval field, Wharton County, has now been dual-completed as an oil and gas producer. The same hole was redrilled to 5,212 ft., with 5½-in. casing set at 5,174 ft. Oil completion was through 48 perforations at 5,146-72 ft. where it gaged 80 bbl. of oil daily through a 10/64-in. choke with 200 lb. pressure on the tubing. The gas completion was made through perforations at 7,070-72 ft. and 5,092-5,108 ft. where it flowed gas and 15 bbl. of condensate daily with 2,000 lb. pressure on the casing. It has a calculated open gas flow of 30,000,000 cu. ft. daily.

Sixteen new locations were reported this week including five wildcats, one each in Chambers, Fayette, Liberty, Matagorda, and Wharton counties. Eight oil wells were completed including one new pay in Altair pool, Colorado County. Three of the six dry holes were wildcats, two in Matagorda and one in Brazos County. Chambers County received the greatest new activity with five starts reported. Matagorda County received four completions to take the lead in completions.

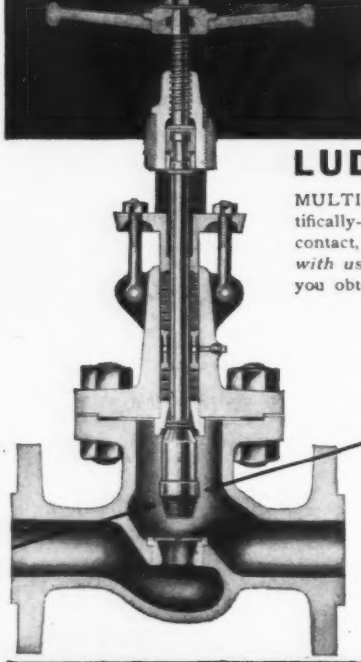
GULF COAST TEXAS SUCCESSFUL WILDCAT

Colorado County: New gas-condensate pay, Altair field—Superior Oil Co. 4-A Mrs. Myra S. Pryer, in BBB&C Sur., Abst. 710, TD 10,366 ft., perf. 10,174-92 ft., IP 117 bbl. condensate per day through 16/64-in. choke and 4,600,000 cu. ft. gas per day, gas-condensate ratio 40,000 to 1, TP 3,050 lb., shut-in TP 3,600 lb., gravity 50°, no water.

GULF COAST TEXAS WILDCAT FAILURES

Brazos County: A. E. Burgin et al N. A. Stewart, 4 mi. SW College Station, in Stephen Jones Sur., dry, TD 3,710 ft.

Matagorda County: Lynn Oil Co. 1 Gen-



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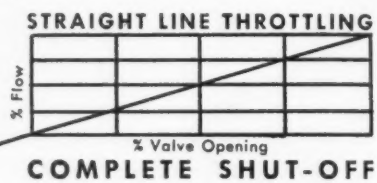

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eral American Life Ins. Co. and W. D. Cornelius, in Wadsworth area, S. R. Fisher League, 10 mi. SE of Bay City, dry, TD 8,890 ft.

Pure Oil 1 State of Texas, Block 308, in North Matagorda Bay, 7 mi. SW of Palacios, dry, TD 5,775 ft.

N. CENTRAL TEXAS

Wilbarger County Wildcat Gets Oil Show, 3,156-63 Ft.

WICHITA FALLS.—In Wilbarger County, Paradise Oil Co. 1 W. T. Waggoner "I," Section 11, H&TC Survey, a wildcat located 4 miles southwest of Harrold, found a showing of oil in lime at 3,156-63 ft., and a drill-stem test of the section recovered 2,000 ft. of oil in 30 minutes. Operators planned to drill ahead to 4,500 ft. before further testing. Two units north of Tolbert, National Associated and The Texas Co.'s 1 Crouch, Section 24, H&TC Survey, was setting casing at 5,400 ft. at the week's end. Tests will be made in the Palo Pinto topped at 5,012 ft. In the northeastern corner of the county, and some 4 miles from production, J. E. Trigg will drill the 1 Will I. Stephens, John Collingsworth Survey, to 4,900 ft. Location is on a block of 2,000 acres, situated 3 miles northeast of the town of Oklaunion.

New Bend conglomerate oil production for Clay County was indicated last week at Jack Grace 1-C Edwards, S. C. Beldon Survey. This well, offsetting the same operator's Strawn discovery, 1-B Edwards, to the northeast, ran drill-stem test in the conglomerate at 6,070-88 ft., total depth, flowed gas in 1½ minutes, oil in 11 minutes.. No water was with the oil. Flowing pressure, through ¾-in. choke, was 1,200 lb. in 15 minutes, with bottom-hole pressure of 2,900 lb. This test logged the Strawn around 5,500 ft. and Caddo lime at 5,909 ft.

In Fisher County a second producer for Eskota field, located in the southeast corner of the county, was assured last week when Skelly Oil Co.'s 2-A Huddleston, Section 11, T&P Survey, recovered 1,000 ft. of clean oil in 36 minutes on drill-stem test at 4,410-47 ft. Flowing pressure was 400 lb., and bottom-hole shut-in. pressure was 1,750 lb. Pay zone is the Palo Pinto. North of Eskota, Horne Oil Co. 1 Wheeler was drilling below 4,285 ft. after logging a slight show of oil in sand at 4,243-53 ft. New work in this area of West Central Texas included two wildcat locations. In Taylor County, 2½ miles southeast of Merkel, W. W. Harvey et al will drill a 3,200-ft. wildcat in Lot 3, Grimes County School Land Survey 147. It is the 1 Sealy-Smith. Location is 1 mile south of the old Drilling & Exploration Co. deep test on the Gibson tract, and 2½ miles north of Ingram pool. In eastern Fisher County, American Liberty Oil Co. has staked location for a 6,000-ft. wildcat, 2 miles south of the town of Sylvester. It will be the 1 W. A. Cross, in Block 46, Bastrop County School Land Survey. Drilling with rotary tools will start soon.

NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: Harvey Drilling Co. 1 C. L. Abercrombie "J," Blk. 24, J. W. Harris Subd., 8½ mi. W of Archer City, elevation 1,093 ft., dry, TD 1,559 ft. in shale, Gunsite 1,467 ft., broken sand with show of oil 1,529-48 ft.

Reno Oil Co. 1 C. W. Conrady, Blk. 79, Jefferson Co. School Land Sur., 2½ mi. NE of Anarene, dry, TD 873 ft., lime with show oil 815 ft.

Clay County: Gus Blakely 1 Engle, Blk. 64, Orange Co. School Land, Shubert Sur., 3 mi. SW of Henrietta, dry, TD 1,004 ft. in shale.

Cooke County: Hollandsworth Drilling Co. 2 Phillip Miller, H. Hester Sur., 4 mi. SW of Valley View, dry, TD 1,391 ft. in shale, no shows.

Young County: T. A. Wright 1 Stewart et al, Sec. 2,796, TE&L Co. Sur., 5 mi. NE of Loving, drilled to 3,628 ft. in 1942, drilled deeper to TD 5,518 ft. in lime, dry, Caddo 4,280 ft., sand with show of oil 4,020-50 ft., lime with show of oil and gas 4,470-75 ft., Barnett 5,132 ft.

WEST CENTRAL TEXAS WILDCAT FAILURES

Shackelford County: E. J. Ruwalt 1 J. C. King, Sec. 38, BAL Sur., 3 mi. S of Albany, dry, TD 1,125 ft. in shale.

Fisher County: H. W. Snowden 1 J. Ubben, Subd. 5, W. E. Richardson Sur., 3 mi. E of Royston, elevtion 1,857 ft., dry, TD 3,208 ft., Saddle Creek lime 3,149 ft.

MISSISSIPPI

Preparations Under Way to Test Forrest County Wildcat

JACKSON.—Superior Oil Corp. 1 Cassie Bradford, SW NW 1-3n-13w, Forrest County deep wildcat, was preparing for completion tests after reaching bottom below 16,000 ft. last week. The test, located 3 miles southeast of Hattiesburg, will make tests on three oil sands found below 13,000 ft. Casing has been run and cemented below 15,700 ft.

In Holmes County, Mid-Continent Development Co.'s wildcat, the 1 Sam D. Hall, 23-13n-3e, had total depth at 5,080 ft. in sandy shale, and shut down. Tops logged were Winona 687 ft., Wilcox 1,060 ft., Midway 2,808 ft., Selma 3,627 ft., and the Eutaw at 4,402 ft. Elevation is 307 ft.

Issaquena County's wildcat, C. H. Osmond

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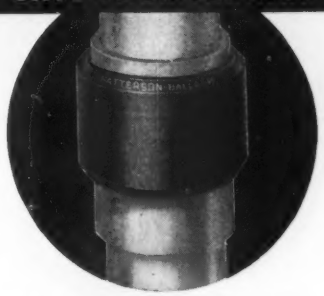

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1 Anderson-Tully, 9-17n-3e, reported sand and shale in cores at 6,681 ft., and 3 ft. of Eutaw sand at 6,114-19 ft.

MISSISSIPPI WILDCAT FAILURES

Sharkey County: Stanolind Oil & Gas Co. 1 School Land, NW NW NW NW 16-11n-5w, dry, TD 5,100 ft., no tops reported.

Warren County: A. W. Hutchings 1 B. N. Simrall, C NE NE NE 18-18n-5e, dry, TD 8,125 ft., Cook Mountain 1,284 ft., Sparta 1,475 ft., Wilcox 2,936 ft., Midway 5,348 ft., Eutaw 6,567 ft., Tuscaloosa 7,278 ft., Marine Tuscaloosa 7,773 ft., Massive sand 8,100 ft.

FLORIDA WILDCAT FAILURE

Collier County: Humble Oil & Refining Co. 1 Lee Cypress Co., SW SE 28-47s-29e, dry, TD 5,286 ft., no tops reported.

CALIFORNIA

New Discovery Completed In Arvin Area of Kern

LOS ANGELES.—The conglomerate-schist basement complex yielded another pool discovery last week in California, rewarding Western Gulf Oil Co. with a 400-bbl. well in the Arvin area of Kern County. The new pool discovery which may eventually prove to be the first well in an entirely new field is Western Gulf 1 DiGiorgio which was completed at 6,163 ft., flowing 400 bbl. of 31.6°-gravity crude oil in 24 hours through 22/64-in. choke.

Although the well had shown indications of discovering a new field more than a week ago, it was not until November 15 that positive evidence resulted. Operators cemented 7-in. pipe at 5,877 ft., stopped for a brief production test at 6,156 ft., set liner and deepened to 6,163 ft. for completion. The 357 ft. of 5-in. liner was perforated from 5,935-6,160 ft.

The new discovery is 330 ft. south and 990 ft. east from the northwest corner of the section, immediately off the southern end of the old shallow Mountain View field. It is less than ½ mile north of a previous dry hole drilled to 5,500 ft. by Tide Water Associated Oil Co. Bolsa Chica Oil Corp., holder of the northwest offsetting lease to Western Gulf's new well has made location for the first development project, 330 ft. north and east from the SW cor. 3-31s-29e.

From a less realistic viewpoint, the most important development of the week in California was establishment of a new drilling depth record for the state by Pacific Western Oil Corp. et al 1 National Royalties, 5-26s-22e, 6 miles north of the Semitropic field and 8 miles east of the Lost Hills field. The new depth record for California was being extended daily but stood at 16,290 ft. at end of the week.

Loffland Brothers Co., now owned by the Chicago Corp., contractor on the Pacific Western et al wildcat project, attained the drilling depth of 16,290 ft. in 199 days. Operators are averaging approximately 30 ft. of new hole per day and are drilling with 130-lb. mud to withstand normal hydrostatic pressure estimated at about 12,000 lb. at bottom. Objective of the test is Vedder sand which has not been reached. Previous erroneous reports that Vedder had been topped were attributed to a short shutdown in drilling about 2 weeks ago when it was necessary to recondition mud.

California operators reversed the recent trend last week and authorized locations for 56 new tests, an increase about 70 per cent over the previous week. Seven new projects at Wilmington headed the list. West Newport Beach and Cymric fields, each with four new locations, were the next most active spots.

CALIFORNIA SUCCESSFUL WILDCATS

Orange County, Huntington Beach area: Barnhart-Morrow Consolidated 2 Alford, 18-6s-10w, perf. 3,570-3,690 ft., 3,370-80 ft., and 3,470 to 3,500 ft., TD 3,785 ft., flowed 935 bbl. daily, 21.5°-gravity oil, 22/64-in. choke.

Kern County, Arvin area: Western Gulf Oil Co. 1 DiGiorgio, 10-31s-29e, flowing 400 bbl. daily, 31.6°-gravity oil, 22/64-in. choke, from schist, TD 6,163 ft.

CALIFORNIA UNSUCCESSFUL WILDCATS

Orange County, Huntington Beach area: M.R.M. Syndicate 1 Crew community, 32-5s-10w, dry, TD 9,752 ft.

Los Angeles County, Turnbull Canyon area: Morton & Sons 3-2 Rowland, 16-2s-10w, dry, TD 7,522 ft.

El Segundo area: Standard Oil Co. of California et al 2 Six Companies, 2-3s-15w, recovered mud and salt water formation test 7,000-75 ft., dry, TD 7,075 ft.

Kern County, McKittrick area: Tide Water Associated Oil Co. 113 M. & S., dry, TD 6,152 ft., Olcese 2,543 ft., first Vedder 4,506 ft., Eocene 5,591 ft., Grandiorite 6,145 ft.

CANADIAN FIELDS

Large Extension Indicated For Lloydminster Field

CHATHAM.—Indication of a large producing area for the Lloydminster field is furnished by wells now being completed. In the Saskatchewan end of the field, to the extreme southeast, Withers-Lone Rock 1, LSD 13, 6-47-26w3, finished with saturated core at 1,782-90 ft., looks like a good producer, oil rising 900 ft. after drilling out the plug. In the extreme northwest, 25 miles distant, R. L. Shaw-Blackfoot 1, LSD 7, 18-50-1w4, is finishing with good production indicated, and will extend the field 2 miles beyond Lloydminster Oil Producers 3, the previous outpost well in that direction.

In the Saskatchewan end; Oil & Gas-Husky 4, LSD 4, 14-47-27w3, bottoming at 1,833 ft., baled 206 bbl. in 24 hours with 1,000 ft. of gassy oil still in the hole. Production is from the Sparky sand. Oil & Gas-Husky 3, LSD 2, 28-47-27w3, has plugged back from the Devonian to test a sand at 1,880-88 ft. Between Lone Rock and the main field, D. B. 1, LSD 6, 13-48-28w3, has finished drilling at 1,866 ft. and is waiting for production equipment. In the main field, Marina 2, LSD 9, 27-49-1w4, is finishing a small producer.

Del Bonita.—On the Del Bonita structure, southern Alberta, McLeod-Del Bonita 1, LSD 13, 14-1-21w4, redrilling after a fishing job, reentered Madison limestone at 4,910 ft. Oil and gas shows are indicated in the top of the Madison, and will be tested.

Northern Alberta.—Interest of oil operators is steadily turning to the extensive and comparatively untested areas surrounding Edmonton, in Northern Alberta. Imperial Oil has secured a reservation of 56,360 acres in Townships 51-52, Ranges 26-27w4, and a further 27,020 acres in Townships 48-49, Ranges 25-26w4. These reservations extend from the southwest limits of Edmonton to a point south of Leduc, where Imperial-Leduc 1, LSD 5, 22-50-26w4, is spudding. McColl-Frontenac Oil has extensive holdings farther south.

Mackenzie Valley.—In the Mackenzie River Valley of the far north, testing of a new area 25 miles downstream from Norman Wells and about 30 miles southwest of the Mackenzie on the Mountain River is under way. Location of the drilling is on the Whirlpool anticline, at the most northerly point at which drilling has yet been undertaken. The immediate drilling is in progress near outcroppings of upper Devonian limestone at a bend of the Mountain River. About 10 miles distant the Hume anticline will later be tested.

OKLAHOMA

Soldier Creek Field Gets 500-Bbl. Extension Well

BIGGEST news of the week in Oklahoma came from the active Cotton County play in the southern part of the state where the Soldier Creek field received two extensions, one of them flowing an estimated 500 bbl. of oil daily. The Martin Corp. 1 Dyer, SW SW SE 32-3s-11w, a mile north of the pool proper, encountered saturated sand at 1,630-39 ft. and a second break at 1,650-51 ft., and flowed an estimated 500 bbl. of oil daily. It has been shut in for tubing and final tests. This well has tentatively been classified as an extension well, although many geologists believe it to be a separate reservoir.

A. R. Dillard extended the same field ½ mile to the northwest with the 2 Enright, NW NW SW 4-3s-11w, when the well started flowing while drilling. No estimate has been made of the flow and testing is to be continued.

Meanwhile, S. F. Hutcheson has what is believed will be the best well in the field to date. It is the 6 Galloway, NW SW SE 4-3s-11w, which blew in with a solid stream through the 7-in. pipe when plug was drilled at 1,617-27 ft. Conservative estimates placed the flow at 1,500 bbl. per day. The well has been killed and operator will run tubing.

New pay zones were indicated for three pools during the past week. In Hughes County, B. C. Deardorff 2 Miller, SE SE SE 5-7n-9e, offset well to a recent Booch sand discovery, is swabbing at the rate of 2 bbl. of oil per hour from the Calvin sand at 880-82 ft. In Lincoln County, Phillips Petroleum Co. has prospects of Prue sand production at the 7 Earlabaugh, NE NE NE 34-13n-7e. Here, a drill-stem test at 3,225-65 ft. showed 6,000,000 cu. ft. of gas and recovered 180 ft. of 40°-gravity oil and 60 ft. of oil-cut mud. Operator is coring ahead. Previous production has been from the Hunton in this area. In Pottawatomie County, Skelly and Tide Water 1 Roister, NW SE SE 21-6n-3e, perforated pipe opposite the Dolomite at 4,010-40 ft. and flowed 271 bbl. of oil daily through a 1-in. choke. This well is north of a Layton sand field.

OKLAHOMA SUCCESSFUL WILDCATS

Garvin County: Carter 1 Buford C-148, C NW NW 5-1n-1w, flowed 278 bbl. of 40.5°-gravity oil per day through ¼-in. tubing choke from Hoxbar sand at 6,070-94 ft., Deese 6,094 ft., Mayes 6,175 ft., Woodford 6,363 ft., Sylvan 6,931 ft., Viola 7,146 ft., sand stringer 7,786 ft., first Bromide sand 7,808 ft., TD 7,905 ft.

McClain County: J. B. Porter and Joe Trigg 1 White, NW SW SE 24-5n-2w, new pay zone in SW Wayne pool, flowed 416 bbl. of 43.7°-gravity oil per day through ¼-in. tubing choke from Hunton at 6,600-30 ft., Belle City 4,240 ft., Hogshooter 4,680 ft., Checkerboard 5,560 ft., Deese 5,720 ft., lime 6,514 ft., sand 6,534-60 ft., TD 6,680 ft.

Pottawatomie County: J. E. Wise 1 State, NE NE NW 16-10n-5e, pumped 32 bbl. of 36°-gravity oil per day from Earlsboro at 3,805-17 ft., Avant 1,650 ft., Belle City 1,780 ft., Hogshooter 2,220 ft., Layton 2,320 ft., Checkerboard 2,585 ft., Oswego 3,330 ft., Prue 3,340 ft., TD 4,754 ft.

OKLAHOMA WILDCAT FAILURES

Cotton County: Harper & Turner et al 1 Moyer, NW NW SW 2-4s-12w, dry, TD 2,510 ft., sand 1,825-46 ft., lime 1,875-85 ft., sandy lime 1,965-75 ft., sand 2,125-35 ft., Fusilinid lime 2,240-52 ft., lime 2,440 ft.

C. Andrade, III, 1 B. B. Menz, SE NE SE 34-4s-12w, dry, TD 2,259 ft., sand 1,480-

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No. 3 —3	Pulleys,	plain bearings,	¼" rope
No. 33—3	Pulleys,	roller bearings,	¼" rope
No. 4 —4	Pulleys,	plain bearings,	¼" rope
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Martin Properties, Inc., 1 Fletcher, SE SE SE NW 11-3s-11w, dry, TD 1,712 ft., sand 1,584-88 ft., lime 1,592-95 ft., broken sand 1,606-16 ft.

Meeker & Anderson et al 1 Kinder, NW NW NW NE 8-3s-12w, dry, TD 2,005 ft., sand 1,134-36 ft., lime 1,195-1,202 ft., sand 1,365-68 ft., lime 1,844-55 ft., Megargel lime 1,885 ft.

H. A. Hamilton 1 Powell, NW NW NW SW 32-2s-12w, dry, TD 2,042 ft., Cisco 1,420 ft., sand 1,492-1,503 ft., Fusilinid lime 1,830 ft., Megargel lime 1,946-59 ft.

S. D. Johnson 1 A. F. Holmes, SW SW SW SW 20-2s-13w, dry, TD 2,295 ft., lime 1,034-46 ft., sand 1,227-47 ft., lime 1,247-58 ft., sand 1,330-40 ft., and 1,355-70 ft., Canyon lime 1,830 ft., Gabbro 2,244 ft.

Frank Murta 1 D. J. Hertzler, SW SE NE 35-2s-13w, dry, TD 2,604 ft., sand 1,480-82 ft., Fusilinid lime 1,875-85 ft., Megargel lime 1,995-2,010 ft., sandy lime and conglomerate 2,040 ft., dolomite 2,160-80 ft., Canyon 2,302-2,575 ft.

G. B. Howell 1 Yantis, SW SW SW SW 15-4s-10w, dry, TD 2,003 ft., sand 774-83 ft. and 1,428-43 ft., lime 1,516-21 ft., sand 1,552-66 ft., Megargel lime 1,640-50 ft., sand 1,650-66 ft., 1,670-82 ft. and 1,684-97 ft.

R. L. Foree et al 1 Jones, SE SE SW SW 17-4s-10w, dry, TD 2,201 ft., sand 1,841-51 ft., Megargel lime 1,851 ft., sand 1,855-59 ft. and 1,975-83 ft.

Garfield County: Vickers Petroleum Co. 1 M. Andrews, SW SW SW 16-21n-4w, dry, TD 4,784 ft., Oread 3,524 ft., upper Layton 4,484 ft., Layton 4,744 ft.

Grady County: George P. Livermore 1 Giles, C NW NW 35-8n-5w, dry, TD 12,253 ft., Oread 6,500-10 ft., Tonkawa 6,985 ft., sand 7,025-35 ft. with stain of oil and 8,058 ft. with stain of oil, Deese 9,440 ft., sand 9,945 ft. with a good stain and odor of oil, Mississippian Caney 10,430 ft., Mayes 10,480 ft., Woodford 10,678 ft., Misener chert 10,792 ft., Bois d'Arc 10,816-21 ft., Viola 11,595 ft.

Lincoln County: Deep Fork Drilling and S. B. Logan 1 D. W. Collier, NW NW SW 6-13n-5e, dry, TD 3,690 ft., Hogshooter 2,430 ft., Prue 3,637 ft., Checkerboard 2,780 ft., conglomerate 2,811-25 ft., Oswego 3,593 ft.

Noble County: Big Bear Oil Co. 1 S. Curby, NW NW SW 23-24n-2w, dry, TD 4,710 ft., Oread 2,520 ft., Perry 3,220 ft., Layton sand 3,832 ft., Big lime 4,010 ft., Oswego 4,080 ft., Prue 4,260 ft., chert 4,462 ft., Woodford 4,622 ft., Viola 4,659 ft., dense 4,680 ft., second Wilcox 4,708 ft.

ILLINOIS

Marion County Wildcat Finds Oil in McClosky

MATTOON.—Pipe has been set for production tests at the Paul Doran and Delta Drilling Co. 1 A. A. Millican Estate, SW SW SE 16-3n-4e, 10 miles northeast of Salem, following the recovery of saturation in the McClosky lime at 2,489-95 ft. A 1-hour drill-stem test at 2,474-95 ft. resulted in the recovery of 2,345 ft. of gas, 100 ft. of clean oil and 60 ft. of oil-cut mud. The wildcat is located about equidistant from the Tonti field of Marion County and the Kenner field of Clay County, or about 8 miles from the nearest oil-producing wells.

About 7 miles northwest of Mt. Carmel, in Wabash County, Hayes & Wolf have recompleted their 1 L. E. Meyer, SW SW NW 8-1s-13w, in the Benoist sand at 2,552-75 ft. Initial production was gaged at 140 bbl. of oil daily on pump following a 40-qt. shot. Total depth of the well is 2,578 ft. It is located approximately 1 mile north of the Hayes & Wolf 1 L. G. Smith, a producing well in NW NW SW 17-1s-13w, and about 3 miles west of production in the Friendsville field. Since no dry holes have been drilled in the area between the 1 Meyer and the 1 Smith, the new well could open a large new area.

The 43 completions reported in Illinois during the past week included 26 oil wells and 17 dry holes. Nine of the latter were wildcat ventures. The seasonal slump in exploratory work made its first appearance as only 8 of the 59 new operations announced during the week were wildcat tests.

ILLINOIS WILDCAT FAILURES

Clay County: National Associated Petroleum Co. 1 D. Jarvis, SW NW NE 5-5n-5e, dry at 2,504 ft., Glen Dean 2,030 ft., Cypress sand 2,207 ft., Benoist sand 2,356 ft., Aux Vases sand 2,433 ft., Ste. Genevieve 2,487 ft.

Olsen Drlg. Co. 1 R. L. Smith, SW SW NE 15-3n-6e, dry at 3,072 ft., Glen Dean 2,413 ft., Benoist 2,792 ft., Aux Vases 2,882 ft., Ste. Genevieve 2,952 ft., Fredonia 2,993 ft.

Fayette County: Luttrell & Everhard 1 Dorr, NW NE NE 35-5n-3e, dry at 2,044 ft., Glen Dean 1,740 ft., Cypress 1,905 ft., Benoist 2,034 ft.

W. L. Belden et al 1 C. F. Kanatzar, SE SE SW 13-7n-3e, dry at 1,962 ft., Tar Springs 1,483 ft., Glen Dean 1,565 ft., Golconda 1,617 ft., Cypress sand 1,720 ft., Benoist 1,868 ft., Aux Vases 1,916 ft.

W. Britton 1 Paradie, SW NW SW 12-7n-3e, dry at 1,866 ft., Tar Springs 1,384 ft., Glen Dean 1,469 ft., Cypress sand 1,679 ft., Benoist 1,766 ft., Renault 1,807 ft., Aux Vases 1,818 ft.

Hamilton County: W. Duncan 1 Hannigan, SW SW SW 13-5s-7e, dry at 3,558 ft., Tar Springs 2,679 ft., Glen Dean 2,729 ft., Benoist 3,222 ft., Renault 3,325 ft., Aux Vases 3,341 ft., Ste. Genevieve 3,397 ft., McClosky 3,464 ft.

Jasper County: Superior 1 R. L. Worcester, SE NW SE 8-5n-9e, dry at 3,152 ft.,

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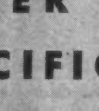

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Glen Dean 2,549 ft., Cypress sand 2,775 ft., Benoist 2,925 ft., Aux Vases sand 3,011 ft., Ste. Genevieve 3,062 ft.

Marion County: Lohman - Johnson 1 H. Hahn et al, NE NE NE 2-1n-4e, dry at 2,996 ft., Tar Springs 2,247 ft., Glen Dean 2,349 ft., Cypress sand 2,573 ft., Benoist 2,683 ft., Aux Vases 2,839 ft., Ste. Genevieve 2,857 ft., McClosky 2,973 ft.

Washington County: Nation Oil 1 H. P. Toensig, NW• SW NW 9-1s-4w, dry at 2,421 ft., Glen Dean 732 ft., Benoist sand 1,077 ft., Ste. Genevieve 1,173 ft., McClosky 1,269 ft., St. Louis 1,305 ft., Devonian 2;270 ft.

ROCKY MOUNTAIN

Stanolind Completes Fourth Gas Well at Beaver Creek

DENVER.—Stanolind Oil & Gas Co. has completed its fourth gas well on the Beaver Creek structure, Fremont County, Wyoming, in its development program following the discovery early in 1938. No wells were drilled during the war. It is 4 unit, C NE SW 10-33-96w, a mile to the southwest of 1 Government, the discovery well, which made 9,000,000 cu. ft. in the Morrison sand at 8,920 ft., total depth. The new completion gaged 10,000,000 cu. ft. at 8,210 ft., in the Lakota sand, which lies above the Morrison. The four wells prove up at least 1,200 acres, with three wells, all outposts, drilling.

Interest in the operation lies not so much in the development of a new gas field as in the prospect that at some future date it will open up large oil reserves in deeper horizons. The dome is on the south end of the Beaver Creek anticline, a major fold roughly paralleling the Big Sand Draw line of folding. The two structures are only a few miles apart, and the most southeasterly well at Beaver Creek is only 7½ miles northwest of Sinclair-Wyoming 3 Unit at Sand Draw, now being completed as the largest producer in the last named field, which in initial tests made 2,107 bbl. in 23 hours.

The similarity between the two operations is striking. Sand Draw produced gas in the Frontier and Dakota formations for 25 years before the big oil production in lower formations was discovered. One well was drilled to 5,345 ft. and found water in the basal Sundance. This discouraged attempts to explore the deeper horizons until 1944 when Sinclair-Wyoming drilled its Tensleep test to 7,588 ft. and brought in the discovery which made 1,300 bbl. of 35°-gravity crude in 16 hours in an open flow test. The finding of water in the Sundance in the discovery well at Beaver Creek, therefore, is not a final answer to what may be found below. Stanolind's 3 Unit, the nearest to Sand Draw, showed some distillates in drill-stem tests above the Dakota. The Tensleep at Beaver Creek probably will be found at around 11,000 ft., considered too deep a few years ago, but which now offers no insuperable problems.

Surprise well at Cat Creek.—Ralph Chamberlain 18-A Rhens, SE SE NE 9-15n-29e, on the west dome of the Cat Creek field, after coring good saturation in the Morrison sand, set the 7-in. at 1,804 ft., and then cored more saturation in the Ellis at 1,869-93 ft., latter being the total depth. The 7-in. then was perforated with 62 shots at 1,735-83 ft., and the well flowed 480 bbl. first 24 hours and subsequently was reported making better than 500 bbl. Most of the 24,000,000 bbl. of oil produced in the field from the Cat Creek sands was recovered on the west dome. The Morrison and Ellis sands, in which discoveries were made more than a year ago, have heretofore shown better results on the Mosby, or middle dome, and on the east Cat Creek high. The new well

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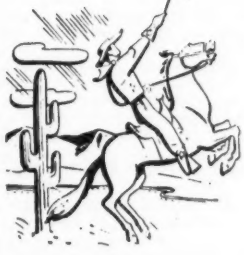

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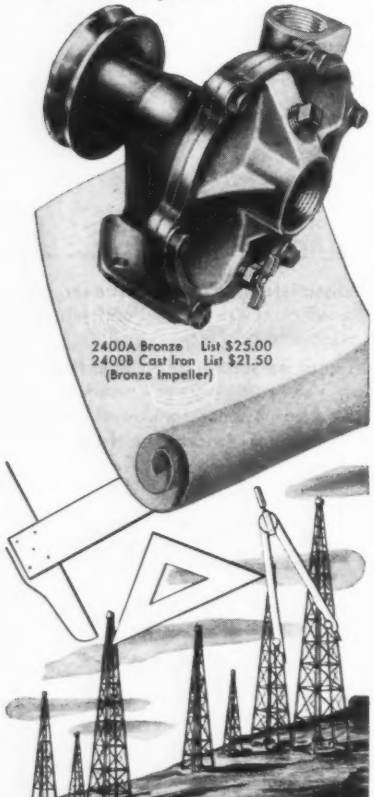

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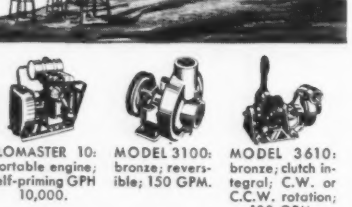

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is a north offset to 12-A Rhens which was estimated at 50 bbl., and a west offset to Continental Oil Co. 11 Harlan, which flowed 48 bbl. of fluid, 35 per cent oil. A southeast offset was abandoned.

New operations.—Eleven new operations were reported, of which one is a wildcat in the Hugo district in eastern Colorado, one each at Beaver Creek, Frannie, and Lost Soldier, in Wyoming; four in Cut Bank and one each at Cedar Creek and Bowdoin, in Montana; and one on Barker Creek, San Juan County, New Mexico.

The Colorado wildcat is Santa Fe Corp.-Dyer & Rice 1 Union Pacific-JOD Ranch, SW SE NW 25-13s-52w, Hugo District, Lincoln County. It will be a test to the top of the red beds at around 3,750 ft., with the Dakota as the main objective. Location was made on surface geology by Charles Lavington, of Denver, and Harry O'Borne, of Colorado Springs.

Completions.—Fourteen wells were completed, of which 8 were oil wells with initial production of 2,004 bbl., 5 were gas wells, and 1 was a dry hole. Four of the oil wells were in the Rangely field, Colorado, and accounted for 1,146 bbl. Wyoming had 4 completions, a gas well at Beaver Creek, 2 oil wells for 328 bbl. at Lost Soldier and Big Muddy, and 1 wildcat failure. Montana had 6 completions, of which 1 at Cat Creek and another in Cut Bank were oil wells for 530 bbl., and 4 gas wells, 1 each at Kicking Horse, Sweetgrass Hills, Cut Bank and Bowdoin.

WYOMING WILDCAT FAILURE

Saratoga, Carbon County: Atlantic Refining Co. 1 Leverson, SW SE SW 30-18n-84w, TD 4,703 ft., dry, fresh water in Sundance.

MONTANA SUCCESSFUL WILDCATS

Kicking Horse, Toole County: Husky Ref. Co. 1 Henry, C SE NE 17-36n-1e, TD 1,469 ft., 7-in. at 1,450 ft., 3,100,000 cu. ft. of gas from Madison lime.

Sweetgrass Hills, Toole County: A. A. Oil Corp. 1-X Parsell, NW NW NE 4-36n-3e, TD 2,036 ft., est. 3,000,000 to 5,000,000 cu. ft. of gas in Bow Island sand.

OHIO, KENTUCKY

Large Gas Well Completed In Salt Creek Medina Pool

COLUMBUS.—B. G. Bartley struck another Clinton gas well in the Salt Creek Medina pool. Their 3 Madge Warne, Section 33, Salt Creek Township, Muskingum County, topped the Clinton at 4,168 ft., and at 4,194 ft. gaged 2,940,000 cu. ft. natural.

Ohio Fuel 1 Spring-Hudson, Section 32, Ripley Township, Holmes County, a northeast extension to the Miley pool, paid 618,000 cu. ft. in the bottom Clinton, 3,142-56 ft. After shot the well was tubed and shut in at 1,120,000 cu. ft.

Barnesville Development Co.'s wildcat test on A. C. Peters, Section 27, Malaga Township, Monroe County, found the Oriskany at 5,132-52 ft. with no shows of oil or gas and only a little water which was exhausted. The test is now shut down, as the operator is undecided about drilling deeper.

Completions and locations continue at a high rate as 32 locations were reported this week, and 30 wells were completed. Brush Creek reported seven locations, followed by Ashland, Cambridge, Lancaster and Sandyville with five each, Stewart four and Mount Vernon one.

OHIO WILDCAT FAILURE

Jackson County, Jefferson Township: Ohio Fuel Gas 1 Marta Brady, Sec. 23, Clinton 2,746-64 ft., TD 2,778 ft.

WESTERN KENTUCKY

OWENSBORO.—The California Co. 1 Spears, 13-L-57, Lincoln County wildcat, has been completed as a dry hole at 6,117 ft. This is deepest test yet drilled in Kentucky with rotary tools.

In Henderson County, The Fisher Oil Co. 1 W. I. Pritchett, 24-O-22, wildcat 2 miles west of Dixie, is drilling ahead below 1,575 ft. after setting 10-in. pipe at 129 ft.

Western Kentucky operators finaled only four tests during the past week, and these met with little success as only one was a successful oil producer. New operations totaled seven and included three in Henderson, two in Union and one each in Daviess and McLean counties.

WESTERN KENTUCKY WILDCAT FAILURE

Lincoln County: California Co. 1 Spears, 13-L-57, elev. 1,125 ft., dry at 6,117 ft., no tops reported.

EASTERN KENTUCKY

ASHLAND.—The Woodloe Howard property in Magoffin County, came in for the biggest completion in weeks in the eastern Kentucky field of operations.

Kentucky-West Virginia Gas Co. completed well No. 836 at 1,310 ft. for 2,321,000 cu. ft. of gas in Maxon.

Kentucky-West Virginia Gas completed well No. 5,667 on the James P. Reynolds property in Floyd County at 3,291 ft., producing 127,000 cu. ft. in shale.

Locations were reported on the Reynolds farm, Floyd County; Sturgill property, Knott County; L. B. Wells farm, Johnson County, and Neal Roberts property, Pike County.

INDIANA

EVANSVILLE.—The Mt. Carmel East field of Gibson County apparently is being extended ½ mile to the northeast by the J. Roy Dee, Trustee, 2 G. & E. Steckler et al, NW NW 23-1s-12w, Knox County wildcat. Pipe has been set for production tests of the Benoist sand at 2,084-96 ft., total depth 2,097 ft., following the recovery of gas in 18 minutes, 300 ft. of clean oil and 60 ft. of oil-cut mud on a 1-hour drill-stem test at 2,077-97 ft.

Indiana completions during the past week totaled 7, including 3 oil wells for 134 bbl. and 4 dry holes. No wildcat completions were reported. Eight new operations were announced during the week. These included five in Posey County, two in Knox and one in Vanderburgh.

EASTERN TEXAS

Intensive Drilling Program Slated for Hawkins Field

DALLAS.—An intensive drilling program involving from 35 to 40 sub-Clarksville tests, was reported on schedule for Hawkins field of Wood County. Production is mainly from the Woodbine, but deeper pay horizons have been indicated to the north at Humble Oil & Refining Co.'s 1 McKnight.

It was said that big pipe will be set on most of the wells, permitting subsequent deepening to the Rodessa, Travis Peak, or the Smackover if developments warrant. In the number of operations, Hawkins has led other East Texas fields, with Humble alone completing a drilling program of 120 wells over the past year.

Locations thus far announced on the drilling program include Humble's 2 C. W. Cumbie, in the McKnight Survey, and 1,000 ft. southwest of the same operator's deep test which reported oil shows in the sub-Clarksville. On top of the structure, the formation produces gas. Work under way included the 1 Farella Scott, in the Wideman Survey and the B-2F M. Morrison, in the Esparcia Survey.

SUMMARY OF OCTOBER COMPLETIONS

	Comp.	Oil	Prod.	Gas	Dry	Under 1,000 ft.	1,000-2,500 ft.	2,500-5,000 ft.	5,000-10,000 ft.	Over 10,000 ft.	Total footage	Rigs and drilling
New York	107	54	121	0	*53	0	107	0	0	0	150,313	146
Pennsylvania	298	158	376	32	†108	18	252	28	0	0	451,470	227
West Virginia	76	15	547	48	13	2	35	31	8	0	221,850	246
Ohio	141	39	639	61	41	23	40	77	1	0	377,324	229
Indiana	41	26	2,232	0	15	3	25	13	0	0	81,844	54
Kentucky	47	17	1,965	8	22	1	36	10	0	0	99,008	56
Illinois	206	108	17,928	0	98	6	68	132	0	0	535,184	251
Michigan	75	15	670	14	46	3	51	20	1	0	145,150	120
Kansas	185	87	29,277	35	‡63	0	14	169	2	0	591,283	342
Neb., Mo., Iowa	1	0	0	0	1	0	0	1	0	0	3,537	1
Oklahoma	381	218	29,460	37	‡126	11	157	167	45	1	1,114,178	521
Texas	691	412	113,240	61	218	42	127	250	252	20	3,186,440	986
North	167	90	13,130	0	77	27	64	64	11	1	432,431	162
West Central	40	20	2,421	1	19	3	14	21	2	0	116,568	45
West	176	150	76,359	0	26	4	22	79	63	8	890,487	251
Panhandle	30	19	2,050	9	2	0	4	25	1	0	93,824	104
Eastern	65	24	5,157	26	15	0	2	15	45	3	404,482	91
Upper Gulf Coast	67	33	5,057	4	30	1	3	11	47	5	458,878	119
Lower Gulf Coast	94	56	7,121	16	22	1	2	17	71	3	613,703	129
South	29	11	1,440	4	14	0	13	13	3	0	92,857	43
South Central	23	9	505	1	13	6	3	5	9	0	83,210	42
Louisiana	151	84	12,281	12	55	2	32	58	30	29	834,968	240
Northern	91	44	4,981	11	36	2	30	51	7	1	297,207	100
Southern	60	40	7,300	1	19	0	2	7	23	28	537,761	140
Arkansas	16	9	1,100	0	7	0	2	12	2	0	60,093	36
Mississippi	22	14	3,569	0	8	0	0	3	12	7	169,774	77
Ala., Ga., Fla.	3	0	0	0	3	0	0	1	2	0	15,647	18
Montana	30	13	766	5	12	3	15	12	0	0	63,097	68
Wyoming	10	4	1,363	2	4	0	1	6	3	0	48,568	72
Colorado-Utah	17	14	6,505	0	3	0	2	1	14	0	96,017	75
New Mexico	50	40	16,995	6	4	2	14	23	11	0	174,069	114
California	135	100	18,580	3	32	3	33	56	36	7	584,464	198
Total October	2,683	1,427	257,614	324	932	119	1,011	1,070	419	64	9,004,275	4,077
Total September	2,520	1,349	234,117	299	872	129	1,006	982	360	43	7,985,214	4,072

Service wells, 5 weeks ending November 2, 1946: *53, †100, ‡2.

North of Hawkins, and of considerable importance to operators in the field, is Humble's deep exploration, the 1 P. H. McKnight, which was last reported drilling below 9,685 ft. Unconfirmed reports place the Glen Rose at 7,153 ft., massive anhydrite at 8,629-8,847 ft., and top of the Pettit at 9,410 ft. Objective here is the Smackover lime.

In Henderson County, Crow & Chastain's 1 Young, Rice Survey, which blew out and burned for 2 weeks, made completion tests said to be good for 13,500,000 cu. ft. of gas daily, open flow, plus an estimated 360 bbl. of 50°-gravity condensate. Gas-oil ratio was 21,000:1. Casing was perforated at 7,580-7,610 ft. and acidized.

LA.-ARK.

Knowles Field Extended 1¼ Miles Northwest

SHREVEPORT.—In Lincoln Parish, R. W. Williams 1 W. E. Cooper, a wildcat outpost to the Knowles field, drilled by W. C. Feazel, of Shreveport, made initial potential of 113 bbl. of distillate through ¼-in. choke, and a gas-oil ratio of 16,443 to 1. Production is from the Bodcaw through perforations at 8,287-8,345 ft. Tubing pressure, flowing, was 3,000 lb., with packer set at 8,250 ft. Location is 25-20n-4w.

As yet no other locations have been made in the new area, which may be due to lack of outlet at this time. Location of the 1 Cooper is 1¼ miles northwest of the California Co. 1 James, nearest production, and is 50 ft. higher on structure than the James well.

In Franklin Parish, Atlas Oil Refining Co. 1 Ayer Timber Co., 26-14n-9e, was also shut in after making an undetermined amount of gas and distillate. Total depth is 7,037 ft., in shale, with perforations at 6,572-86 ft. A drill-stem test recovered five stands of 65°-gravity and one stand of gas-cut mud. Shut-in bottom-hole pressure was 2,700 lb. The flow of gas and distillate was made after operators reran tubing.

In Webster Parish, H. L. Hunt and Nebo Oil Co. 134-F Goodpine, 9-13n-5w, was coring below 5,349 ft. with only slight shows of oil. Cores at 4,699-4,719 ft. recovered light gray sand with no shows; at 4,904-20 ft. there was light brown porous sand and at 5,183-5,203 ft. it recovered sand and sandy shale with slightly salty taste. Elevation is 191 ft.

NORTH LOUISIANA WILDCAT FAILURES

LaSalle Parish: Placid Central Co. 123 La. Central, C W/2 SE 20-11n-3e, dry, TD 7,324 ft., no tops reported.

Richland Parish: C. M. Bagley 1 Greer Estate, C SE SW NE 28-16n-7e, dry, TD 3,360 ft., Wilcox 1,250 ft., Midway 2,140 ft., chalk 2,628 ft., Lower Cretaceous 3,170 ft.

ARKANSAS WILDCAT FAILURES

Ouachita County: Garland Anthony 1 Haltom Estate, C NW NW NW 4-15s-19w, dry, TD 3,660 ft., Nacatoch 1,433 ft., Buckrange 2,116 ft., Tokio 2,400 ft., Glen Rose 2,545 ft., Massive anhydrite 2,580 ft., Basal Massive anhydrite 2,600 ft., James absent.

J. W. Coan et al 1 Werner Saw Mill, C SE SE SW 28-15s-17w, dry, TD 3,514 ft., no tops reported.

KANSAS

Triple-Zone Field Indicated In Marion County

THE Anderson-Prichard Oil Corp. has opened a possible triple-zone oil field in Marion County at the 1 Weyand, SE NW SW 27-19s-1e. This wildcat was drilled to 3,311 ft. after topping the Simpson sand at 3,289 ft., where pipe was set. When plug was drilled, the well swabbed 65 bbl. of clean oil, no water, in 5 hours.

Prior to this a drill-stem test in the Mississippi lime at 2,790-2,810 ft. showed gas with 925 lb. bottom-hole pressure, and a drill-stem test in the Viola lime at 3,211-16 ft. recovered 270 ft. of clean oil and 30 ft. of mud in 45 minutes.

Another important Kansas development during the past week was the revival of the old Virgil pool of Greenwood County. Here, Dwight Wilson 1 Barnett, NW SW NW 13-14-12e, in an abandoned area of the field, has been completed to produce 106 bbl. of oil daily from the Mississippi lime at 1,717-23 ft.

KANSAS SUCCESSFUL WILDCAT

Kearny County: Stanolind Oil & Gas 1 Stallman, SW SW SW NE 24-23s-37w, gas production not gaged from Permian at 2,637-46 ft. and 2,729-43 ft.; Herrington 2,571 ft., Towanda 2,687 ft., Ft. Riley 2,729 ft., TD 2,773 ft.

KANSAS WILDCAT FAILURES

Ellis County: Huber & Baco Drilling 1 Furthmeyer, NW NW SE 26-12s-16w, dry, TD 3,520 ft., anhydrite 1,145 ft., Heebner 3,167 ft., Lansing-Kansas City 3,220 ft., Arbuckle 3,485 ft.

Kearny County: Stanolind Oil & Gas 1 Kester, SW SW SW NE 25-21s-36w, dry, TD 2,900 ft., Herrington 2,711 ft., Towanda 2,822 ft., Ft. Riley 2,864 ft.

Pratt County: Sohio Petroleum et al 1 Stalcup, NE NE NE 15-26s-12w, dry, TD 4,356 ft., Lansing-Kansas City 3,632 ft., Mississippi lime 4,064 ft., Kinderhook 4,091 ft., Viola 4,128 ft., Simpson shale 4,225 ft., Simpson sand 4,249 ft., Arbuckle 4,298 ft.

Rice County: Nadel & Gussman 1 Gouldner, SE NW SW 9-18s-9w, dry, TD 3,285 ft., anhydrite 435 ft., brown lime 2,881 ft., Lansing-Kansas City 2,900 ft., Basal Kansas City 3,215 ft., sandy conglomerate 3,256 ft., Arbuckle 3,280 ft.

Stanolind Oil & Gas 1 La Munyan, SE SE SE 3-19s-10w, dry, TD 3,368 ft., anhydrite 445 ft., Lansing-Kansas City 2,961 ft., Arbuckle 3,310 ft.

Sedgwick County: H. H. Brown et al 1 Brown, C N/2 NE NW 12-29s-2e, dry, TD 2,180 ft., Lansing-Kansas City 2,120 ft.

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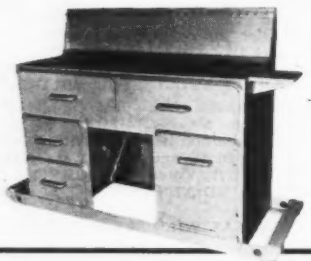

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Drilling Contractors

Brown Drilling Co., Long Beach, is preparing to ship a second mechanical rig to the Middle East where it is doing contract drilling work for Arabian American Oil Co.

Royer Farris Drilling Co. recently acquired leases on approximately 700 acres including the E½ SE of Section 5, SW of 4, NE of 8, and NW of 9-20s-10w, consolidated for a close-in play on the south flank of the Silica pool in Rice County, Kansas.

Texola Drilling Co. is rigging up a new wildcat location 6 miles north of Chandler in Lincoln County, Oklahoma. The test is the 1-A Strough, NW NW SE 4-15n-4e, about 3½ miles west of nearest production in the small Kendrick pool.

Sharon Drilling Co. of Wichita has been purchased by Sohio Petroleum Co. The deal, involving all the properties and assets of the Sharon company, was completed late in October.

H. H. & B. Drilling Co. has staked location for the 1 Werth in SW SW SW 6-16-18w, a wildcat test 1 mile south of the Ellis County, Kansas, line in Rush County and 6 miles southwest of the Schoenchen pool. The venture is on a block of 640 acres and is located about 2 miles west and ½ mile north of a dry hole completed last September.

Henry Hendrix has been awarded contracts for two wells to be drilled by Paul Rossi in the Mount Vernon pool of Posey County, Indiana. They are the 2 George B. Curtis, SW SW NE 30-6s-13w, and the 1 Lynn M. Strack, SW NW SE 30-6s-13w, both scheduled to go to 1,450 ft.

Pike Drilling Co., Los Angeles, is preparing to start two important California wildcat drilling operations. Contracts have been obtained for Standard Oil Co. of California 1 Stanley community, 33-4s-10w, in the Garden Grove area of Orange County. Objective is a test of the basement expected at about 9,500 ft. Location is being made ready. Another new Pike contract is for drilling Universal Consolidated Oil Co. et al 1 Devils Canyon, a wildcat in 27-5n-17w, Los Angeles County, in the Castaic area north of Western Gulf Oil Co.'s Oak Canyon field. This test is also projected to the basement which is expected around 7,500 ft.

Helmerich & Payne are drilling contractors for a wildcat test midway between the Dayton and Logan pools of Phillips County, Kansas. It is the Stanolind 1 Brenneke, SE SE SE 2-4-19w, 5 miles south of the town of Stuttgart and located on a block of six sections held by Stanolind. The venture is based on core-drill information.

Fowler Drilling Co., Long Beach, is drilling California Exploration Co. 1 Park in the West Newport Beach pool in Orange County, California.

Shafer-Toler Drilling Co. has been granted permit to drill the 1 Dr. Edgar A. Green in NW SW SE 22-8s-9e, Gallatin County, Illinois. It will be a rotary test to the McClosky lime.

Biddle Drilling Co. is drilling ahead at 2,790 ft. at the 4 Soeken, NE SW SW 22-17-11w, a test in the Kraft-Prusa pool of Barton County, Kansas.

Denton & Spencer, of Calgary, Alta., are completing Ram River Oils 4, LSD 9, 36-34-10w5, on the Ram River-Clearwater structure in the northern Alberta foothills. The test, bottoming

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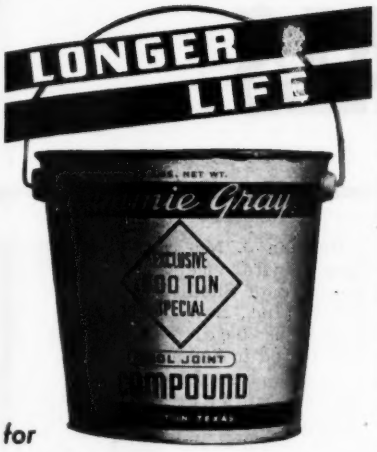

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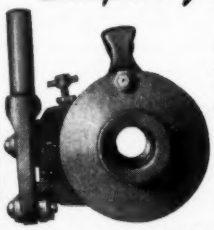

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at 1,460 ft., is making water shutoff preparatory to acidizing.

Rocky Mountain Drilling Co., Los Angeles, has obtained contract to drill Shell Oil Co., Inc., 2-1 Winters community, 18-8n-1e, near the Solano and Yolo counties line, west of Sacramento.

Cook Drilling Co. is rigging up rotary tools for the 1 Enna W. Garrett, NE NW SE 11-1n-3e, a venture in Madison County, Mississippi. This company is also drilling a test in Lincoln County, the 1 B. B. Wilson, NE SE 4-6n-8e, which is now below 7,530 ft.

Parker Drilling Co. is building derrick preparatory to drilling the 1 Robert H. Boling, 33-8n-7e, Lincoln County, Mississippi, which will be drilled on contract for The California Co.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that sealed bids will be received until 1 P.M. Thursday, December 5, 1946, for land described herein situated within the known geologic structure of the Caddo oil and gas field, undefined, L. M., Louisiana. This land is offered to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act of February 25, 1920 (41 Stat. 437, 30 U.S.C. sec. 181) as amended, in the following parcels: Parcel No. 1, T. 20 N., R. 15 W., sec. 31, S½NE¼, W½SE¼, 160 acres. Parcel No. 2, T. 20 N., R. 16 W., sec. 3, lot 3; sec. 4, lots 3, 4, 5, 37.79 acres. Parsel No. 3, T. 20 N., R. 16 W., sec. 9, lots 5, 6; sec. 10, lots 6, 8 to 10 inclusive; sec. 15, lots 1, 2; sec. 16, lot 1, 235.35 acres. Parcel No. 4, T. 20 N., R. 16 W., sec. 25, lot 1; sec. 36, lots 1, 2, 22.71 acres. Parcel No. 5, T. 20 N., R. 16 W., sec. 32, lots 1, 3, 91.56 acres. Parcel No. 6, T. 20 N., R. 16 W., all fractional section 20, 37.83 acres. Parcel No. 7, T. 21 N., R. 16 W., sec. 2, S½SE¼, 80 acres. Parcel No. 8, T. 21 N., R. 16 W., sec. 9, SE¼, 160 acres. Parcel No. 9, T. 21 N., R. 16 W., sec. 11, E½SE¼, 80 acres. Parcel No. 10, T. 21 N., R. 16 W., sec. 12, N½SW¼, NW¼SE¼, 120 acres. Total 1,025.24 acres. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16⅔ per cent to for gas, in accordance with the schedule shown in the lease form. Bids must be submitted on each parcel separately; but if two or more parcels are awarded to the same bidder they may be included in a single lease provided the combined acreage does not exceed 640 acres. Each bidder must submit with the bid one-fifth of the amount bid in cash, or by certified check, made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease, required under 43 CFR 192.19. The envelopes should be plainly marked, "Bid for Parcel No. Caddo field Louisiana. Not to be opened before 1 P.M., December 5, 1946." No bids received after the hour fixed herein for submitting bids will be considered. The remainder of the bonus and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished by a successful bidder prior to the issuance of a lease. The deposits of the other bidders will be returned upon acceptance of the successful bids. The successful bidder will be required to agree not to discriminate against any employee or applicant for employment because of race, creed, color, or national origin, and to require an identical provision to be included in all subcontracts Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Fred W. Johnson, Acting Director.

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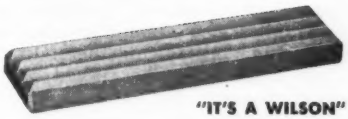

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PERSONALS

Burns Moves Up to New Position With Shell

H. S. M. BURNS, whose 21 years with the Shell organization embraces experience in four major branches of the oil industry, has been named senior vice president of Shell Oil Co., Inc., in the East of Rockies territory, it was announced last week by Alexander Fraser, president of the company.

Starting as a geophysicist with Shell's exploration department in California, Burns progressed rapidly through positions of increasing responsibility in the manufacturing and marketing departments there. In the latter department, he served as division manager and later as general sales manager.

Since 1935, he has spent most of his time in Colombia where he organized and directed Shell's exploration and production activities. Burns' headquarters are now in Shell's New York office.

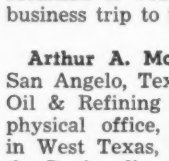
F. M. Graham was reelected president of the Alberta Petroleum Association at a recent meeting in Calgary. **J. O. Galloway** and **F. F. Reeve** were named vice presidents, and **E. W. Kolb**, secretary-treasurer.

L. F. Peterson, Fort Worth, division engineer for Stanolind Oil & Gas Co., held a general meeting of field engineers last week to discuss engineering problems throughout the division. **Lloyd Elkins**, assistant chief petroleum engineer, and **J. B. Rosen**, petroleum engineering supervisor, from Tulsa, attended. Field engineers from the North Texas and New Mexico areas included **Ralph Ludwick**, **F. W. Foell**, **L. M. Fry**, **F. V. Cooksey**, **W. D. Powers**, **C. L. Kelly**, **R. C. Pusey**, and **R. L. Gray**.

Lucien Dumas, president of Societe Nationale des Petroles de Languedoc Mediterraneen, Paris, and **J. H. De Vries**, general manager of Regie Autonome de Petroles, Saint-Gaudens, returned to France recently after a business trip to the United States.

Arthur A. Moore has returned to San Angelo, Tex., to reopen Humble Oil & Refining Co.'s divisional geophysical office, directing operations in West Texas, West Central Texas, the Panhandle, and New Mexico. He was previously at Big Spring, Tex. **Rolfe G. Wells**, recently engaged in geophysical work in Florida, will be assistant to Moore.

Dr. Byron B. Boatright, consulting engineer and formerly a member of the firm Boatright & Mitchell, has been elected a vice president of Republic Natural Gas Co. He will be in charge of the newly created engineering and research department, with headquarters in Dallas.



A. L. Nickerson, former board chairman of Vacuum Oil Co., Ltd., in London, has been named member of board of directors of Socony-Vacuum Oil Co., Inc. He is now in the United States. Nickerson started to work for Socony-Vacuum in 1933 as a service station salesman and rose through the ranks to become assistant general manager of the eastern marketing division before going to London.

French oil men currently in the United States on business include the following: **G. R. Valat**, S. N. Marep, Paris; **Fernand Leca**, technical manager, Societe Cherifienne des Petroles, Labat, Morocco; **Rene De Panasieu**, manager of Societe Nationale des Petroles d'Aquitaine, Toulouse; **O. Ledermann**, chief engineer, Societe Nationale des Petroles du Languedoc Mediterraneen, Montpellier; **Andre Martin**, technical manager, Direction des Carburants, Paris.

Norman J. McGaw, general vice president of Shell Oil Co., Inc., New York, has been transferred to San Francisco headquarters of the company where he will continue in the same executive capacity. McGaw was employed by Shell in 1925 as a statistician in the San Francisco office. He became assistant to the president at St. Louis in 1933 and has been a vice president since 1939.

Edwin J. Barth, petroleum and asphalt technologist formerly with Anglo-Mexican Oils, Ltd., and more recently with Sinclair Refining Co., has joined the refinery division of Wood River Oil & Refining Co., Inc., as asphalt technologist.

L. H. J. Hersch, manager of Caribbean Petroleum Co. (Shell), has returned to Maracaibo after a short business trip to the United States.

Harold W. Fisher, a director of Standard Oil Co. of New Jersey, is in London and scheduled to leave Southampton December 7 on the Queen Elizabeth for New York.

L. C. McClaskey, producing division, Standard Oil Co. (N. J.), is spending a few weeks in Nassau in connection with the transfer of records to the Nassau company.

Dr. A. B. Kinzel, vice president of Union Carbide & Carbon Research Laboratories, Inc., has been elected chairman of the Engineering Foundation. The foundation is devoted to furthering research in the fields of science and engineering.

D. B. Taliaferro, Bartlesville, Okla., and **R. K. Guthrie**, Dallas, have been assigned to open a substation of the U. S. Bureau of Mines in Wichita Falls, Tex.

Sam Lucas, of The Texas Co., was elected president of Oilmen's Club of Houston at an organizational meeting of the club last week. **Tom W. Ackley**, production superintendent of Scurlock Oil Co., was named vice president, and **Fred Shipman**, of The Texas Railroad Commission, Gulf Coast division, secretary-treasurer.

W. A. ALEXANDER

W. A. Alexander, B. Dykstra, and **E. G. Robinson** have been named by Shell Oil Co., Inc., to head three of the four areas in Shell's newly-reorganized territory east of the Rockies. **R. B. Roark** will remain manager of the Tulsa area. Alexander will be at Houston, Dykstra at Midland, Tex., and Robinson at New Orleans. Each will be responsible for all exploration, production and other activities in his area, with over-all activities to be coordinated at Houston, to which an advisory staff will be added.

B. DYKSTRA

E. G. ROBINSON

Joseph N. Greene, president of the Alabama Gas Co., Birmingham, has been reappointed chairman of the membership committee of the American Gas Association. Greene, an A.G.A. director, will be assisted by a group of gas company executives representing different sections of the country.

E. C. Brown, Long Beach, president of Brown Drilling Co., left this week for Saudi Arabia where his company is engaged in contract drilling operations for Arabian American Oil Co. He will return to this country late in December.

W. G. Skelly, president of Skelly Oil Co., who was injured in a fall following a board of directors session at the American Petroleum Institute's Chicago meeting last week, has been brought to his home in Tulsa and is reported to be recovering satisfactorily. **C. R. Musgrave,** vice president of Phillips Petroleum Co., who also was injured at the A.P.I. meeting when he was struck by an automobile, is reported recovering but is expected to remain in Chicago for about 2 months.

Clarence Norman, Carter Oil Co. plant foreman at St. Elmo, Ill., has been transferred to the marketing department in Tulsa.

Howard T. Jayne, safety inspector for The Philadelphia Gas Works Co., Philadelphia, has been reappointed chairman of the Accident Prevention Committee of the American Gas Association to serve the 1946-1947 term.

Albert R. Yugerwitz, pumpman at the Bayway, N. J., refinery, of Standard Oil Co. of New Jersey, has been promoted to head pumpman in the oil-movement and storage department.

George Dickinson, for many years with Caribbean Petroleum Co. in Venezuela, will leave soon for a vacation in the United States after completing his assignment in Comodoro Rivadavia, Argentina, with Diadema Argentina S.A. de Petroleo.

A reunion of former mining and petroleum engineer students at Ohio State University recently brought together 11 members of the oil industry. Included were **D. R. Speer,** Standard Oil Co. (Ohio); **Robert L. Alkire,** West Virginia University; **George M. Schneider,** Associated Engineers; **F. E. Steele,** Lion Oil Refining Co.; **William Straker,** Zanesville Tool & Supply Co.; **Robert N. Anderson,** Ohio Fuel Gas Co.; **Fred B. Machol,** Solvent Service; **J. D. Castner,** West Virginia Gas Corp.; **Robert E. Speer,** U. S. Geological Survey; **C. V. Spangler,** J. F. Pritchard & Co., and **Ray R. Vincent,** Robins, Ohio.

H. H. Allen has been transferred from Bartlesville to Houston by Phillips Petroleum Co. to become Gulf Coast district geologist. **O. M. Hudson,** Evansville, Ind., has been transferred to Corpus Christi, Texas, to become South Texas district geologist. In other Phillips personnel moves, **I. J. Pierce** was named Illinois district geologist; **J. F. Hardwick** was made division geologist for Oklahoma City, Shawnee, and Bartlesville districts, and **O. H. Whitcomb,** assistant superintendent of the land department in Bartlesville, was assigned supervision of the Kansas district in addition to the Rocky Mountain district and Canada, which he already has.

Dr. Robert E. Wilson, chairman of the board, headed a group of 11 directors of Standard Oil Co. (Ind.) scheduled to leave Chicago November 19 on a 5-day inspection trip of subsidiary properties in Texas and Louisiana. With Dr. Wilson were **A. W. Peake,** president; **Dr. Max G. Paulus,** vice president, manufacturing; **Harry F. Glair,** general manager, manufacturing; **Roy F. McConnell,** vice president, sales; **Bruce K. Brown,** vice president, development; **Buell F. Jones,** vice president, general counsel; **H. E. Hanson,** general manager, sales; **L. C. Welch,** general manager, lubricating and sales technical-service departments; **Frank O. Prior,** vice president, production; and **R. J. Lindquist,** financial vice president.

James Courtney, superintendent in West Texas for Snowden Oil & Gas Co., will head the company's new offices in Midland, Tex.

SHIFTS:

N. J. Lea, foreman, The Texas Co., Bakersfield, Calif., to Santa Barbara, Calif.; **Eugene E. Nichols, Edward C. Sandburg, C. L. Kistner, W. S. Payne, Jr., R. D. Updyke, Earl A. Gray, H. L. Hales,** engineers, Richfield Oil Corp., all from Taft, Calif., to Tupman, Calif.; **R. L. Swoope,** engineer, Universal Oil Products Co., Riverside, Ill., to Berwyn, Ill.

Robert Baum, foreman, Seismograph Service Corp., McLeansboro, Ill., to Cushing, Okla.; **J. T. Humphries,** superintendent, N. H. Wheless Drilling Co., Natchez, Miss., to Washington, Miss.; **F. W. Briggs,** foreman, Continental Oil Co., Durant, Miss., to Ruston, La.; **H. H. Plummer,** engineer, The California Co., Buffalo, Mo., to Harvey, La.; **J. M. Varner,** superintendent, Helmerich & Payne, Inc., Guthrie, Okla., to Duncan, Okla.

C. K. Walker, engineer, Tide Water Associated Oil Co., Associated, Calif., to San Gabriel, Calif.; **Bradford C. Adams,** geologist, The Texas Co., King City, Calif., to Redlands, Calif.; **Robert W. Lange,** geologist, Amerada Petroleum Corp., San Marino, Calif., to Garden City, Kans.; **G. L. Knox,** geologist, Standard Oil Co. of California, San Francisco to Bakersfield, Calif.; **Charles H. Ise,** geologist, Sinclair Prairie Oil Co., Pecos, Tex., to Wichita Falls, Tex.; **J. F. Svetlik,** engineer, Phillips Petroleum Co., Borger, Tex., to Phillips, Tex.

W. E. Lyle, geologist, Gulf Oil Corp., Crane, Tex., to Midland, Tex.; **E. Allen,** superintendent, Houston Oil Co. of Texas, Houston, to Bellaire, Tex.; **Irvin Lee Peters,** foreman, Helmerich & Payne, Inc., Odessa, Tex., to Duncan, Okla.; **John A. Murphy,** engineer, Phillips Petroleum Co., Odessa, Tex., to Midland, Tex.; **John Roy Johnson,** engineer, Shell Oil Co., Inc., Wichita Falls, Tex., to Elk City, Okla.; **J. L. White,** engineer, Magnolia Petroleum Co., West Lake, La., to Eunice, La.; **Roy F. Tucker,** foreman, Plantation Pipe Line Co., Coalinga, Ala., to Mumford, Ala.

R. C. Hanson, superintendent, Standard Drilling Co., Salem, Ill., to Bowie, Tex.; **James F. Junge,** engineer, Gulf Oil Corp., Pittsburgh to Port Arthur, Tex.; **R. E. Holman,** engineer, Atlantic Refining Co., Philadelphia, to Norwood, Pa.; **John M. Peasley,** engineer, Great Lakes Pipe Line Co., Macedonia, Iowa, to Nebraska City, Neb.; **Ray S. Seifert,** foreman, Amerada Petroleum Corp., Chadron, Neb., to Tulsa; **Ivan Hall,** engineer, Socony-Vacuum Oil Co., Inc., Casper, Wyo., to Augusta, Kans.;

Clifford H. Mendenhall, engineer, Stanolind Pipe Line Co., Casper, Wyo., to Alexandria, Minn.

Equipment Men in the News

Three Promoted in Republic Rubber

G. L. SMITH

Three promotions within the sales department of Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, Ohio, have been announced by O. S. Dollison, vice president and general manager. New sales manager and department head is G. L. Smith, former traveling sales manager. Myron C. Meyer, assistant sales manager, now replaces Smith as traveling sales manager. Ralph W. Deemer has taken Meyer's position as assistant sales manager.

Wilson Supply Announces New Promotions

Wallace D. Wilson, president of Wilson Supply Co., has announced the following promotions: R. W. Jeffrey, former secretary and treasurer, to vice president; L. R. Bandy and George W. Gist, city salesmen, to vice presidents; J. S. Roberts, assistant secretary and treasurer, to secretary and treasurer; J. W. King, auditor, to assistant treasurer; A. L. Pippert, sales department, to assistant secretary.

Colorado Fuel & Iron Appoints New Managers

Howard J. Jones has been selected manager of industrial relations for The Colorado Fuel & Iron Corp. Horace J. Jones has been appointed manager of industrial engineering. Both formerly were associated with Republic Steel Corp.

Griffin Appoints Wilde

Griffin Chemical Co., San Francisco, announced the appointment of T. E. "Ed" Wilde to the company's technical service and process development staff. For the past 15 years, Wilde has acted in various capacities for technical departments of the Union Oil Co., most recently as assistant manager of the Chemical Products Division in Los Angeles. He also served in the manufacturing department at Union Oil.

S. S. C. Holds Annual Elections

The directors of the Seismograph Service Corp., at an annual meeting in Tulsa, have named G. H. Westby, president; T. A. Manhart, executive vice president; A. J. Barthelmes and J. E. Hawkins, vice presidents; John S. Carlson, secretary; and A. B. Chappell, treasurer. At the same time George H. Speirs, manager at Caracas, Venezuela, was elected president of Seismograph Service Corp. of Delaware, a wholly owned subsidiary which conducts operations in South America. Westby announced crews of the company are operating in most oil areas of this country, Mexico, Colombia, Venezuela, Egypt, Iraq, Palestine, France, and the Bahamas. A new English subsidiary, Seismograph Service, Ltd., has commenced operations in Trinidad and another crew is being assembled for service in the British Empire.

Western Oil Tool Affiliates With Waldrip

Western Oil Tool & Engineering Co., Inc., formerly of Glendale, Calif., has become affiliated with Waldrip Engineering Co., and has moved offices to the Waldrip plant at Hollydale, Calif. The Waldrip company will manufacture and sell a new line of portable drilling and well-service units conceived and designed by James Moon and E. M. Wagner.

Chalfant Elected Director National Supply

HENRY CHALFANT

Henry Chalfant was elected a director of the National Supply Co. at a recent meeting of the board. He will fill the vacancy recently created by the retirement of P. J. Shouvlin. Chalfant is assistant secretary of National Supply Co.

Brown Well Service Opens West Texas Shop

H. C. Brown, vice president and manager of operations for Brown Well Service of West Texas, is one of the organizers of a new shop at Odessa, Tex. Opening of the shop was celebrated with a barbecue for several hundred operating men. Service will be furnished the Permian basin region for the reconditioning of drill collars, subs, and kelly joints.

Shupert Joins Moorlane

Clifford "Shup" Shupert has joined Moorlane Co. and will serve in the sales order department. Prior to his recent connection, Shupert was in the Tulsa office of Jarecki Manufacturing Co. for some 20 years.

Allinson Forms Petroleum Construction Co.

J. J. ALLINSON

Announcement of the opening of the firm of J. J. Allinson & Son., Inc., to specialize in engineering and construction of petroleum and heavy chemical plants, is made by J. B. Allinson, vice president. President is J. J. Allinson, formerly chief resident engineer with Kellex Corp. at the atomic-bomb project in Oakridge, Tenn. Other officers are C. G. Kirkbride, vice president; J. B. Allinson; Baine P. Kerr, secretary and treasurer; and Monroe Shakno, chief designing engineer. Home offices are at 506 Scanlan Building, Houston.

International Harvester Transfers Rooks

International Harvester Co. has announced that Monroe Rooks, former motor-truck branch manager at New Orleans, has been transferred to the Birmingham general line branch in the same capacity. Rooks will replace P. H. Baker, former manager at Birmingham, who will establish his own dealership at Macon, Ga., handling International Harvester equipment. R. E. Solberg, former assistant manager of the order and distribution department has resigned to be a Harvester dealer at Elk Point, S. D.

Rawlings Sales Promotion Manager of Kelite

Appointment of T. W. Rawlings as sales-promotion manager is announced by Harry L. Smith, vice president of Kelite Products, Inc. Rawlings replaces Allen W. Schmidt who created the vacancy when he left Kelite to join the account executive staff of The McCarty Co.

Hiett Now With Gorman-Rupp

Appointment of Gilmore Hiett as advertising and sales promotion manager is announced by Gorman-Rupp Co., Mansfield, Ohio. Hiett previously was advertising manager for refrigerators and home freezers with Westinghouse Electric Corp. He is also a former newspaper man and was advertising manager of the Mansfield News-Journal and the Marion (Ohio) Star.

Executives, supervisors, party chiefs, and 10-year men at Seismograph Service Corp. annual meeting